

Annual Report
Petroleum and Coal
Activities in Thailand

1996



Message From The Director - General

Environmental concern seems to be in everyone's heart nowadays. However, only concern for the environment is not sufficient, one must really understand the correct concept of environmental protection so that the protection of the earth's environment can be undertaken effectively.

With the responsibility of overseeing the exploration for and production of mineral and energy resources and other related tasks. We, at the Department of Mineral Resources (DMR), exercises its authority with the above concept in mind. The staff of DMR believe that the development of mineral and energy resources, especially crude oil, natural gas, and coal or lignite, can go hand in hand with the environmental protection. This is possible and can be agreed by all if it is comprehended that changes of all things, living or non-living, are certain.

The environment, consisting of both living and non-living things, is a dynamic thing. Therefore, to protect the environment is not to maintain it in any static conditions, i.e. no further changes, but to let or, sometimes, manage its changes so that most living things including human being can benefit most from those changes both at present and in the future.

Following the stated philosophy, DMR has been and still is promoting and accelerating, when possible, exploration for and production of petroleum and lignite in the manner that impact on the environment is minimum and monitored in such a way that the country and her people benefit most from the operations.

We, therefore, would like to invite all petroleum, coal, and related companies to be involved in exploration for and production of petroleum and lignite in Thailand. We guarantee that no obstacles will intervene the operations of all existing and prospective companies if those operations are reasonably environmentally friendly ones.

Finally, we would like to thank petroleum and coal companies and other concerned parties for their cooperation with DMR to reach our common goals, exploration and production in such a conservationable, safe, and environmentally friendly manner. We look forward to such private-governmental cooperation in the future.



Message From The Director

The Mineral Fuels Division (MFD) has been involved with petroleum exploration and production in Thailand since promulgation of the Petroleum Act in 1971. Along those years, MFD's main technical duties concerning petroleum resources include supervision of petroleum exploration and production. In this capacity, MFD has been working closely with oil and gas companies to ensure that all operations are in accordance with good petroleum practices.

Good petroleum practices refer to efficient, conservationable, safe, and environmentally friendly operations. MFD, therefore, has been concentrating on conservation, safety, and environmental protection for both exploration and production operations.

Conservation in the upstream petroleum industry means exploration for and production of petroleum in such a way that petroleum is minimally wasted and the produced petroleum is maximized with minimum required energy and economical viability. For example, flow tests of discovery wells should be performed as short time as necessary so that burning of petroleum, and hence waste of petroleum, is minimized. Production planning and implementation must also carefully be done such that petroleum produced can be maximized under technical, economical, and time constraints.

Safety and environmental protection, for the sake of well being, must also be observed in all operations. MFD does not only promote the remedial measures but also the preventive measures for safety and environmental matters. In addition, voluntary actions on operator side have been stressed while acceptable levels of safety and environmental protection are still kept under supervision.

With all these close supervisions, it is believed that petroleum produced locally has not been and will not be wasted and has been and will be appropriately conserved, hence maximum benefit for Thailand.

Besides technical matters, MFD is also responsible for all non-technical matters related to the upstream petroleum industry. Concession awarding, tax exemption process, employment of expatriates, and other related matters have long been and will also be MFD's major tasks. MFD will keep on executing these tasks in such a way that oil and gas companies can carry out their works as smooth and efficient as possible.

On the lignite and coal resources, MFD still continues to assess and promote exploitation of the country's lignite resources. The agency also has the same purpose as for petroleum when dealing with exploration and exploitation of lignite.

In conclusion, MFD will continue to undertake its major tasks so that maximum benefit is for Thailand and Thai people and, of course, with reasonable returns to all parties involved.



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Highlights

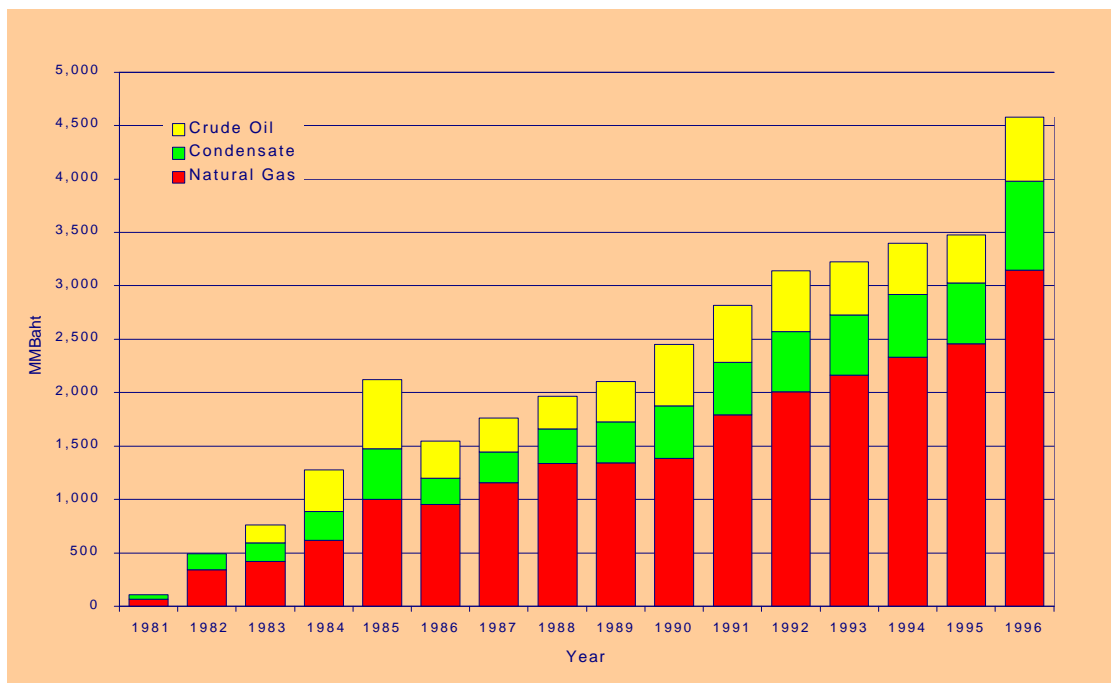
	1995	1996	
1) Geophysical Surveys			
• magnetic	–	638	km
• gravity	–	638	km
• 2D seismic	3,586	8,028	line-km
• 3D seismic	4,058	8,088	line-km
2) Drilling			
• exploratory	1	7	Well
• appraisal	32	40	Well
• development	77	132	Well
3) New Prospects			
• No. of new prospects	1	3	
4) Production (Total Sale)			
• by	7	7	concessionaire
• from	21	21	field
• natural gas	401	469	BCF
• condensate	10.9	13.1	MMBBL
• oil	8.2	9.2	MMBBL
• values	27.95	36.77	billion baht
• royalties	3.48	4.58	billion baht
5) Concessions			
• No. of concessions	21	28	
• No. of concession blocks	28	37	

Benefits

The annual production of petroleum in 1996 kept growing from the preceding years. The sale value of all petroleum categories was around 36.771 billion baht, 31% higher than the value of 1995. The figures fell into 25.195, 6.639, 4.353 and 0.584 billion baht for natural gas, condensate, crude oil and Shell's gas-produced LPG, respectively. The production gave return to the country in form of royalty, more or less, in the amount of 4.577 billion baht.

As of 31 December 1996, the total sum of petroleum sold was 282.352 billion baht from 3.322 TCF of natural gas, 106.923 MMBBL of condensate, 103.184 MMBBL of crude oil and 638 tons of Shell's gas-produced LPG. The cumulative royalty was 35.238 billion baht.

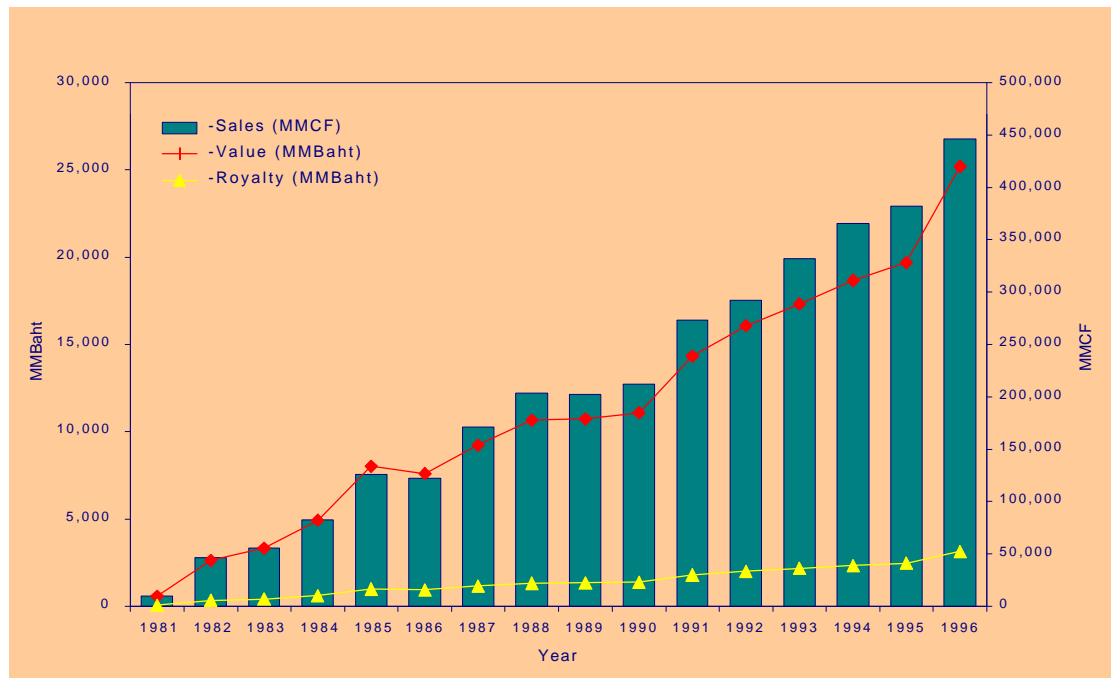
Royalty from Produced Petroleum (1981-1996)



Sales, Value and Royalty of Natural Gas

PETROLEUM FIELD	1981-1990	1991	1992	1993	1994	1995	1996	TOTAL
Erawan Field								
-Sales (MMCF)	614,049.61	101,054.43	90,109.79	103,285.72	95,485.47	100,333.63	94,447.88	1,198,766.52
-Value (MMBaht)	34,280.72	5,488.35	4,931.50	5,099.09	4,437.03	4,547.78	4,547.99	63,332.46
-Royalty (MMBaht)	4,303.03	686.04	616.44	637.39	554.63	568.47	568.50	7,934.50
Baanpot + South Satun Fields								
-Sales (MMCF)	76,693.50	31,718.72	27,286.68	18,916.24	10,927.44	13,552.18	20,280.53	199,375.29
-Value (MMBaht)	4,439.66	1,869.16	1,530.04	979.45	570.85	712.21	1,189.34	11,290.70
-Royalty (MMBaht)	554.95	233.64	191.25	122.43	71.35	89.03	148.67	1,411.32
Satun Field								
-Sales (MMCF)	327,300.43	76,535.01	73,376.19	70,849.74	71,631.44	70,151.58	72,676.87	762,521.27
-Value (MMBaht)	19,128.17	4,273.19	4,327.67	3,894.42	3,888.85	3,910.96	4,474.02	43,897.29
-Royalty (MMBaht)	2,391.02	534.15	540.96	486.80	486.11	488.87	559.25	5,487.16
Platong + Kaphong Fields								
-Sales (MMCF)	161,373.79	34,846.69	20,921.46	14,005.78	15,135.29	18,288.47	25,329.75	289,901.23
-Value (MMBaht)	9,160.55	1,860.88	1,164.45	713.68	687.67	907.90	1,191.80	15,686.94
-Royalty (MMBaht)	1,145.07	232.61	145.56	89.21	85.96	113.49	148.97	1,960.86
Funan + Jakrawan Fields								
-Sales (MMCF)			46,106.03	58,968.71	59,240.36	55,412.80	74,646.77	294,374.67
-Value (MMBaht)			2,990.45	3,748.84	3,509.01	2,937.84	3,343.92	16,530.06
-Royalty (MMBaht)			373.81	468.61	438.62	367.23	417.99	2,066.25
Surat Field								
-Sales (MMCF)			1,139.95	6,087.96	4,001.60	2,440.66	0.00	13,670.17
-Value (MMBaht)			58.09	332.70	271.34	127.88	189.65	979.66
-Royalty (MMBaht)			7.26	41.59	33.92	15.99	23.71	122.46
Gomin Field								
-Sales (MMCF)						1,032.36		1,032.36
-Value (MMBaht)						60.33	1,016.86	1,077.19
-Royalty (MMBaht)						7.54	127.11	134.65
Bongkot Field								
-Sales (MMCF)				25,700.20	71,750.97	84,780.88	120,745.86	302,977.91
-Value (MMBaht)				1,416.80	3,451.58	4,911.33	7,401.65	17,181.36
-Royalty (MMBaht)				177.10	431.45	613.92	925.21	2,147.68
Sirikit Field et al.								
-Sales (MMCF)	52,656.31	10,452.92	12,252.06	13,339.49	14,084.45	12,945.89	14,641.87	130,372.98
-Value (MMBaht)	1,838.35	312.55	320.66	380.58	938.03	549.74	638.11	4,978.03
-Royalty (MMBaht)	229.79	39.07	40.08	47.57	117.25	68.72	79.76	622.24
Nam Phong Field								
-Sales (MMCF)	26.46	18,517.88	20,890.94	20,549.46	23,054.88	23,457.23	23,490.80	129,987.65
-Value (MMBaht)	0.86	541.08	752.26	759.66	908.69	1,019.74	1,201.91	5,184.19
-Royalty (MMBaht)	0.11	67.63	94.03	94.96	113.59	127.47	150.24	648.03
Total								
-Sales (MMCF)	1,232,100.09	273,125.65	292,083.10	331,703.30	365,311.90	382,395.69	446,260.32	3,322,980.04
-Value (MMBaht)	68,848.31	14,345.21	16,075.11	17,325.22	18,663.05	19,685.72	25,195.25	180,137.87
-Royalty (MMBaht)	8,623.96	1,793.15	2,009.39	2,165.65	2,332.88	2,460.71	3,149.41	22,535.15

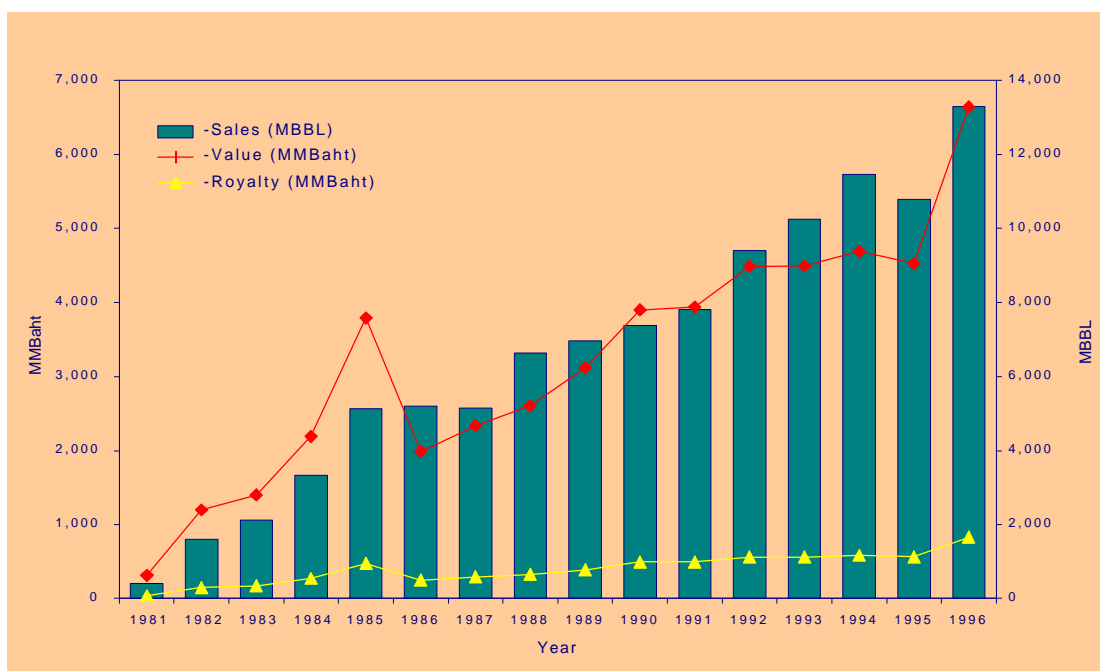
Remarks : Sales in Platong+Kaphong, Surat, Funan+Jakrawan, and Gomin based on their productions.
: South Satun included in Baanpot Field (started in 1983).
: Kaphong included in Platong Field.
: Sirikit started in 1983.
: Jakrawan included in Funan Field (started in 1993).



Sales, Value and Royalty of Condensate

PETROLEUM FIELD	1981-90	1991	1992	1993	1994	1995	1996	Total
Erawan Field								
-Sales (MBBL)	22,101.94	3,485.82	3,045.29	3,313.98	3,407.04	3,298.36	3,038.82	41,691.26
-Value (MMBaht)	12,257.33	1,760.00	1,455.60	1,456.39	1,404.21	1,381.79	1,481.77	21,197.08
-Royalty (MMBaht)	1,517.01	220.00	181.95	182.05	175.53	172.72	185.22	2,634.48
Baanpot Field								
-Sales (MBBL)	3,111.48	221.81	102.69	137.41	199.85	66.10	126.03	3,965.37
-Value (MMBaht)	1,613.90	112.15	49.01	60.12	83.76	121.24	64.66	2,104.85
-Royalty (MMBaht)	199.93	14.02	6.13	7.52	10.47	15.15	8.08	261.29
Satun + South Satun Fields								
-Sales (MBBL)	10,286.83	2,834.00	3,001.07	2,893.25	2,877.10	2,695.94	3,023.94	27,612.13
-Value (MMBaht)	4,924.60	1,424.16	1,434.89	1,275.19	1,181.22	1,067.26	1,477.48	12,784.81
-Royalty (MMBaht)	643.49	178.02	179.36	159.40	147.65	133.41	184.68	1,626.01
Platong + Kaphong Fields								
-Sales (MBBL)	8,409.88	1,276.52	902.02	658.98	737.17	973.47	987.40	13,945.43
-Value (MMBaht)	4,031.58	643.24	430.27	289.80	303.13	408.79	493.66	6,600.47
-Royalty (MMBaht)	496.95	80.40	53.78	36.22	37.89	51.10	61.71	818.06
Funan Field								
-Sales (MBBL)			2,297.01	2,614.06	2,201.75	1,837.39	1,514.22	10,464.42
-Value (MMBaht)			1,094.95	1,147.35	901.14	769.28	741.21	4,653.93
-Royalty (MMBaht)			136.87	143.42	112.64	96.16	92.65	581.73
Jakrawan Field								
-Sales (MBBL)					224.29	138.35	271.80	634.44
-Value (MMBaht)					90.51	57.80	137.66	285.97
-Royalty (MMBaht)					11.31	7.22	17.21	35.74
Surat Field								
-Sales (MBBL)			57.01	179.01	589.21	154.52	133.02	1,112.77
-Value (MMBaht)			27.02	79.17	241.57	64.36	64.14	476.26
-Royalty (MMBaht)			3.38	9.90	30.20	8.04	8.02	59.54
Gomin Field								
-Sales (MBBL)						63.31	1,224.82	1,288.13
-Value (MMBaht)						25.45	590.48	615.93
-Royalty (MMBaht)						3.18	73.81	76.99
Bongkot Field								
-Sales (MBBL)				454.66	1,233.96	1,553.94	2,967.21	6,209.77
-Value (MMBaht)				184.29	485.07	633.83	1,588.58	2,891.77
-Royalty (MMBaht)				23.04	60.63	79.23	198.57	361.46
Total								
-Sales (MBBL)	43,910.14	7,818.15	9,405.08	10,251.35	11,470.37	10,781.38	13,287.25	106,923.72
-Value (MMBaht)	22,827.42	3,939.55	4,491.75	4,492.31	4,690.61	4,529.80	6,639.64	51,611.07
-Royalty (MMBaht)	2,857.37	492.44	561.47	561.53	586.32	566.22	829.95	6,455.30

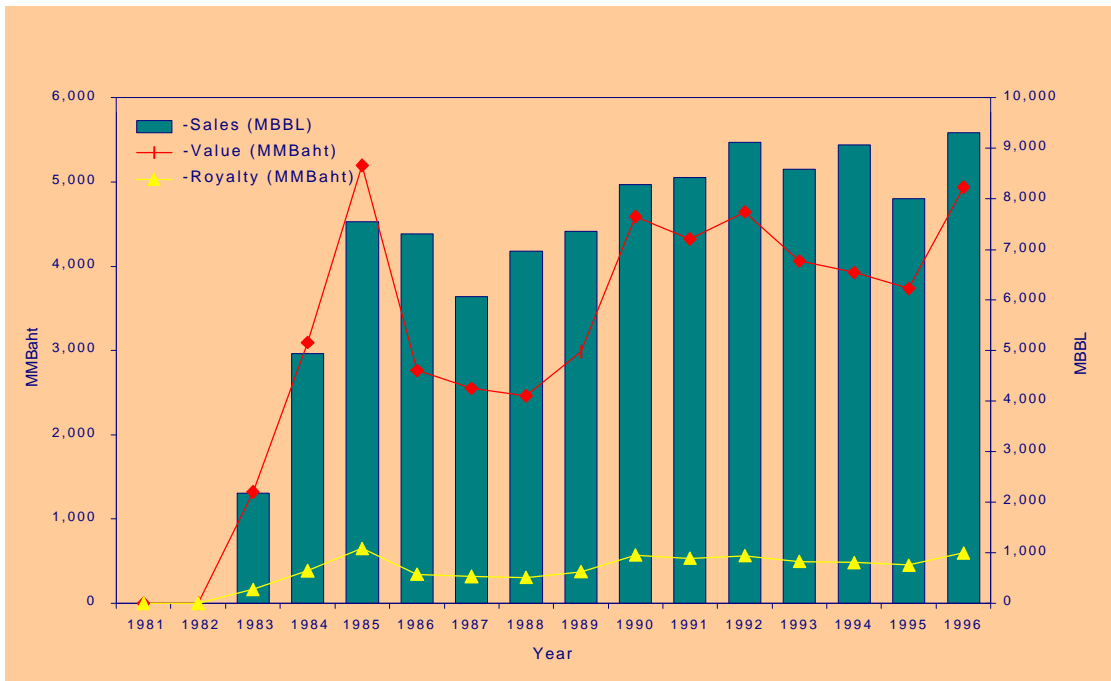
Remarks : South Satun included in Satun Field.
 : Jakrawan included in Funan Field (started in 1993).
 : Kaphong included in Platong Field.



Sales, Value and Royalty of Crude Oil and LPG

PETROLEUM FIELD	1981-90	1991	1992	1993	1994	1995	1996	Total
Sirikit (LPG) *								
-Sales (MMKG)	41.10	92.15	100.90	97.22	102.97	96.50	107.61	638.45
-Value (MMBaht)	251.51	598.44	665.47	628.09	566.45	585.42	584.83	3,880.20
-Royalty (MMBaht)	31.44	74.81	83.18	78.51	70.81	73.18	73.10	485.02
Sirikit Field et al.								
-Sales (MBBL)	50,191.72	8,245.90	8,598.86	8,019.73	8,039.21	6,415.69	6,800.62	96,311.72
-Value (MMBaht)	24,559.24	3,653.83	3,790.74	3,247.12	3,000.92	2,524.72	3,174.15	43,950.73
-Royalty (MMBaht)	3,069.90	456.73	473.84	405.95	375.12	315.59	396.77	5,493.90
Nang Nuan Field								
-Sales (MBBL)	475.75	0.00	0.00	85.19	603.38	999.30	1,908.64	4,072.27
-Value (MMBaht)	156.14	0.00	0.00	28.44	224.45	417.87	919.00	1,745.90
-Royalty (MMBaht)	19.52	0.00	0.00	3.55	28.05	52.23	114.88	218.23
Kamphaeng Saen + U-Thong Fields								
-Sales (MBBL)		144.84	456.57	420.92	339.19	464.54	350.91	2,176.97
-Value (MMBaht)		55.99	166.22	141.44	109.19	164.71	154.97	792.52
-Royalty (MMBaht)		2.80	8.31	7.08	5.46	8.24	7.75	39.63
Bung Ya + Bung Muang Fields								
-Sales (MBBL)		36.71	67.73	58.08	81.79	71.39	151.16	466.86
-Value (MMBaht)		14.69	25.08	20.04	26.57	26.37	66.96	179.71
-Royalty (MMBaht)		0.73	1.25	1.00	1.33	1.32	3.35	8.99
Wichian Buri Field								
-Sales (MBBL)						54.70	101.66	156.36
-Value (MMBaht)						16.81	37.92	54.73
-Royalty (MMBaht)						0.84	1.90	2.74
Total								
-Sales (MBBL)	50,667.47	8,427.45	9,123.17	8,583.92	9,063.57	8,005.62	9,312.98	103,184.18
-Value (MMBaht)	24,966.89	4,322.95	4,647.51	4,065.12	3,927.58	3,735.90	4,937.83	50,603.79
-Royalty (MMBaht)	3,120.86	535.07	566.59	496.09	480.77	451.39	597.75	6,248.51

Remarks : *LPG's sale not included in total sale.
: Wichian Buri started in June 1995.



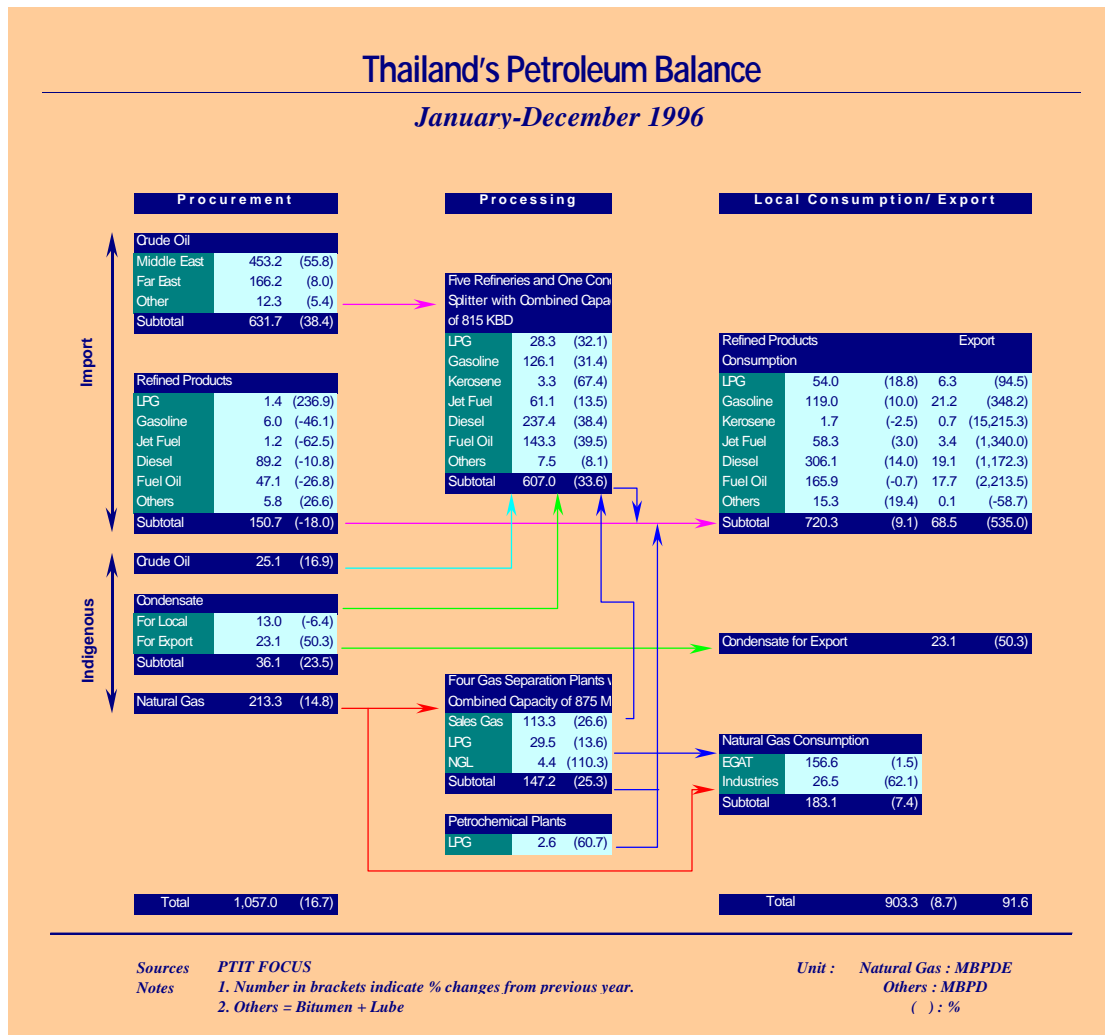
National Petroleum Balance

In 1996, Thailand consumed 903.3 thousand barrels of oil equivalent (MBPDE), while a total procured petroleum volume was 1,057.0 MBPDE.

Total indigenous petroleum supply for 1996 were 274.5 MBPDE or 25.97% of total supply, in which crude oil accounted for 2.4% or 25.1 MBPDE, condensate for 3.4% or 36.1 MBPDE and natural gas for 20.2% or 213.3 MBPDE.

Imported petroleum made up the remaining 74.03% of total supply 14.3% for oil products or 150.7 MBPDE and 59.7% for crude oil or 631.7 MBPDE.

On the consumption side: natural gas of 20.3% or 183.1 MBPDE were used as fuel in the power and other industrial plants and 79.7% or 720.3 MBPDE were consumed in terms of LPG, gasoline, kerosene, jet fuel, diesel, fuel oil and others.



Concession

Seven Petroleum Concessions were awarded for a total of nine exploration blocks; four blocks in onshore area, three blocks in the Gulf of Thailand and two blocks in the Deep Sea Andaman.

The two supplementary Petroleum Concessions issued were for the transfer of interest in the concessions and the change of work obligations.

23 May 1996

Issuing of Supplementary Concession (No. 4) to Petroleum Concession No. 2/2529/34 giving approval to Premier Oil Pacific Ltd. to transfer 50% of its right in block B11/27 to Amerada Hess Overseas Exploration Ltd. with effect from 6 February 1995 pursuant to Section 50 of the Petroleum Act B.E. 2514.

19 June 1996

Issuing of Petroleum Concession No. 1/2539/48 awarding two exploration blocks, W8/38 and W9/38, in the Deep Sea Andaman to Unocal Bangkok, Ltd. (operator, 46 ²/₃%), Total Khorat Ltd. (33 ¹/₃%), and Statoil Siam Ltd. (20%).

27 June 1996

Issuing of Supplementary Concession (No. 2) to Petroleum Concession No. 6/2534/41 giving approval to Ampollex (Thailand) Ltd. to transfer the remaining 50% of its right in block B10/32 to Statoil Siam Ltd. with effect from 11 September 1995 pursuant to Section 50 of the Petroleum Act B.E. 2514 and to transfer the drilling of one well to be drilled in the fifth year (27 June 96-26 June 97) to the sixth year pursuant to Section 30 of the Petroleum Act B.E. 2514.

27 June 1996

Issuing of Petroleum Concession No. 2/2539/49 awarding the exploration block B13/38 in the Gulf of Thailand to PTT Exploration and Production Public Company Limited.

24 October 1996

Issuing of Petroleum Concession No. 3/2539/50 awarding the exploration block B8/38 in the Gulf of Thailand to SOCO Exploration (Thailand) Co., Ltd.

28 October 1996

Issuing of Petroleum Concession No. 4/2539/51 awarding the exploration block B11/38 in the Gulf of Thailand to Texaco Exploration (Thailand) II Ltd.

1 November 1996

Issuing of Petroleum Concession No. 5/2539/52 awarding the exploration block 5643/38 in northeastern Thailand to Cairn Energy (Thailand) Ltd.

11 November 1996

Issuing of Petroleum Concession No. 6/2539/53 awarding the exploration blocks 5340/38 and 5440/38 in northeastern Thailand to Amerada Hess Exploration (Thailand) Co., Ltd. (operator, 35%), Kerr-McGee (Thailand) Ltd. (35%), and Novus Exploration (Thailand) Co., Ltd. (30%)

15 November 1996

Issuing of Petroleum Concession No. 7/2539/54 awarding the exploration block 5441/38 in northeastern Thailand to Anschutz (Thailand) Co., Ltd.

Petroleum Concessionaires in Thailand (as of December 1996)

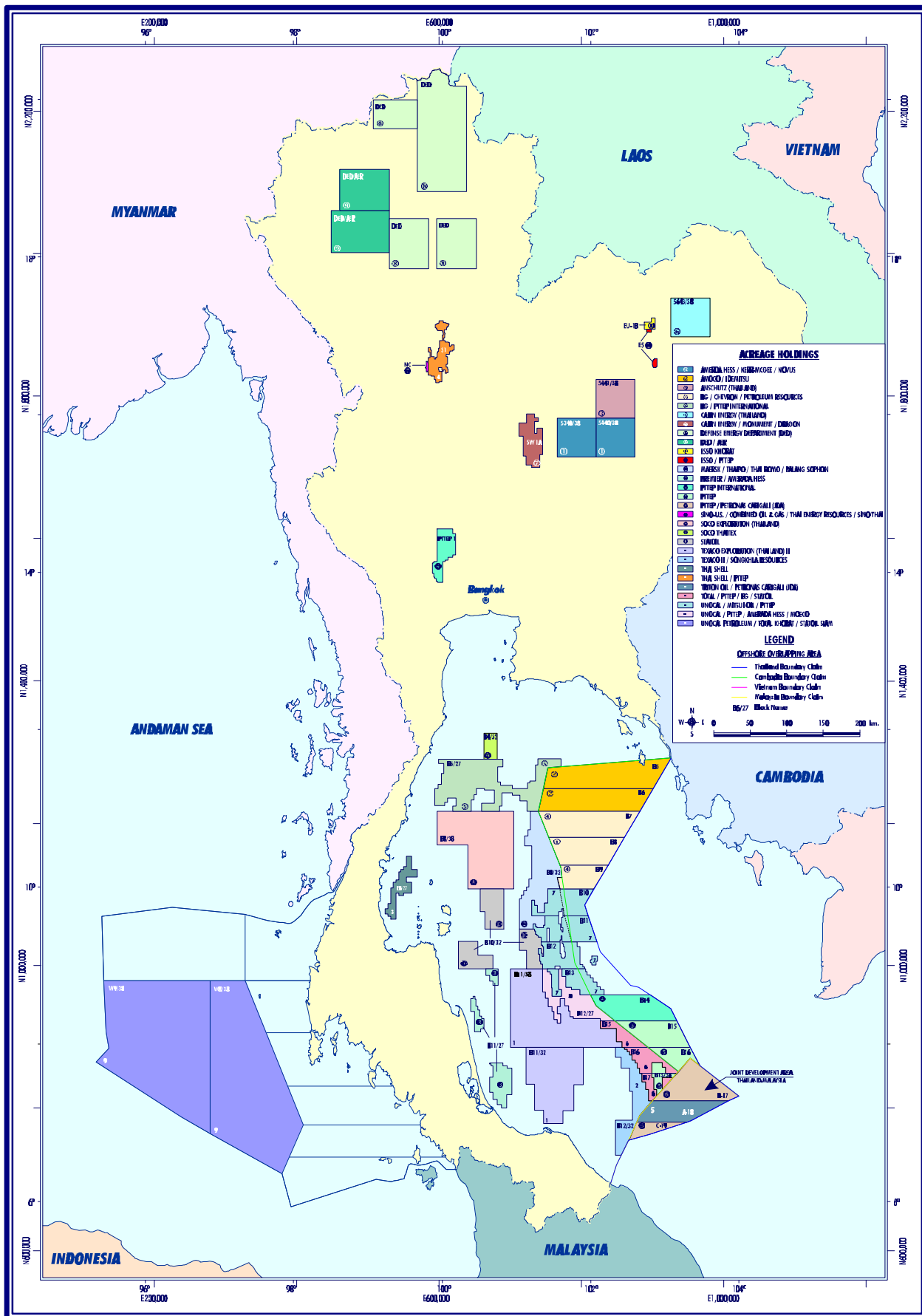
Concess. No. Date of Issue	Concessionaire (s)	Share (%)	Block	Concession area (sq. km)		
				Exploration	Production	Reserve
GULF OF THAILAND						
<u>1/2514</u>	Amoco Thailand Petroleum Co. (Operator)	50.00	B5	4,645.00	-	-
26 Nov 71	Idemitsu Oil Development Co., Ltd.	50.00	B6	5,510.00	-	-
<u>1/2515/5</u>	<u>Gas Sale Agreement No. 2 (Unit Area I)</u>					
1 Mar 72	Unocal Thailand, Ltd. (Operator)	70.00	B10	-	110.86	779.83
	Mitsui Oil Exploration Co., Ltd.	30.00	B11	-	118.80	1,069.89
	<u>Gas Sale Agreement No. 2 (Supplementary) (Unit Area II)</u>					
	Unocal Thailand, Ltd. (Operator)	71.25				
	Mitsui Oil Exploration Co., Ltd.	23.75				
	PTT Exploration and Production Public Co., Ltd.	5.00				
	<u>Thailand-Cambodia-Vietnam Overlapping Area</u>					
	Unocal Thailand, Ltd. (Operator)	60.00	B10	1,382.90	-	-
	Mitsui Oil Exploration Co., Ltd.	40.00	B11	1,401.49	-	-
<u>2/2515/6</u>	<u>Gas Sale Agreement No. 1</u>					
1 Mar 72	Unocal Thailand, Ltd. (Operator)	80.00	B12	-	482.17	866.43
	Mitsui Oil Exploration Co., Ltd.	20.00	B13	-	233.98	952.73
	<u>Gas Sale Agreement No. 2 (Unit Area I)</u>					
	Unocal Thailand, Ltd. (Operator)	70.00				
	Mitsui Oil Exploration Co., Ltd.	30.00				
	<u>Gas Sale Agreement No. 2 (Supplementary) (Unit Area II)</u>					
	Unocal Thailand, Ltd. (Operator)	71.25				
	Mitsui Oil Exploration Co., Ltd.	23.75				
	PTT Exploration and Production Public Co., Ltd.	5.00				
	<u>Thailand-Cambodia-Vietnam Overlapping Area</u>					
	Unocal Thailand, Ltd. (Operator)	80.00	B12	419.58	-	-
	Mitsui Oil Exploration Co., Ltd.	20.00	B13	481.47	-	-
<u>3/2515/7</u>	PTT Exploration and Production Public Co., Ltd.	40.00	B16	-	320.00	1,083.11
8 Mar 72	Total Exploration and Production Thailand (Operator)	30.00	B17	-	105.00	413.38
	BG Thailand Ltd.	20.00				
	Statoil (Thailand) Ltd.	10.00				
	<u>Thailand-Cambodia-Vietnam Overlapping Area</u>					
	PTT Exploration and Production Public Co., Ltd.	100.00	B16	*	-	-
<u>4/2515/8</u>	British Gas Asia Inc. (Operator)	50.00	B7	4,760.00	-	-
9 Mar 72	Chevron U.S.A. Inc.	33.33	B8	3,400.00	-	-
	Petroleum Resources (Thailand) Pty., Ltd.	16.67	B9	2,260.00	-	-
<u>5/2515/9</u>	PTT Exploration and Production Public Co., Ltd.	40.00	B15	-	254.00	1,025.00
10 Mar 72	Total Exploration and Production Thailand (Operator)	30.00				
	BG Thailand Ltd.	20.00				
	Statoil (Thailand) Ltd.	10.00				
	<u>Thailand-Cambodia-Vietnam Overlapping Area</u>					
	PTT Exploration and Production International Ltd.	100.00	B14	2,768.00	-	-
	<u>Thailand-Cambodia-Vietnam Overlapping Area</u>					
	PTT Exploration and Production Public Co., Ltd.	100.00	B15	*	-	-
<u>3/2528/28</u>	Thai Shell Exploration and Production Co., Ltd.	100.00	B6/27	-	4.00	1,302.60
6 Feb 85						
<u>1/2529/33</u>	PTT Exploration and Production Public Co., Ltd.	45.00	B12/27	3,024.38	452.62	-
15 Jan 86	Unocal Thailand, Ltd. (Operator)	35.00				
	Amerada Hess International Exploration Ltd.	15.00				
	MOECO Thai Oil Development Co., Ltd.	5.00				
<u>2/2529/34</u>	Premier Oil Pacific Ltd. (Operator)	50.00	B11/27	2,572.08	-	-
6 Feb 86	Amerada Hess Overseas Exploration Ltd.	50.00				
<u>1/2532/35</u>	BG Thailand Ltd. (Operator)	50.00	B5/27	7,565.00	-	-
9 Aug 89	PTT Exploration and Production International Co., Ltd.	50.00				
<u>1/2534/36</u>	Maersk Oil (Thailand) Ltd. (Operator)	312/3	B8/32	5,192.21	-	-
1 Aug 91	Thaipo Ltd.	312/3				
	Thai Romo Ltd.	312/3				
	The Sophonpanich Co., Ltd.	5.00				
	<u>Tantawan Production Area</u>					
	Thaipo Ltd. (Operator)	46.34	B8/32	-	274.70	-
	Thai Romo Ltd.	46.34				
	The Sophonpanich Co., Ltd.	7.32				
<u>6/2534/41</u>	Statoil Siam Ltd. (Operator)	45.00	B10/32	4,396.64	-	-
11 Sep 91	Unocal Petroleum, Ltd.	45.00				
	Mitsui Oil Exploration Co., Ltd.	10.00				
<u>7/2534/42</u>	Soco Thaitex Inc.	100.00	B4/32	669.00	-	-
11 Sep 91						
<u>1/2535/45</u>	Texaco Exploration (Thailand) II Ltd. (Operator)	35.00	B12/32	2,837.00	-	-
12 Mar 92	Songkhla Resources Ltd.	65.00				
<u>3/2535/47</u>	Texaco Exploration (Thailand) II Ltd.	100.00	B11/32	7,145.78	-	-
19 Mar 92						
<u>2/2539/49</u>	PTT Exploration and Production Public Co., Ltd.	100.00	B13/38	655.00	-	-
27 JUN 96						

* Total area of the two blocks is 2,080 sq. km

Petroleum Concessionaires in Thailand (as of December 1996)

Concess. No. Date of Issue	Concessionaire (s)	Share (%)	Block	Concession area (sq. km)		
				Exploration	Production	Reserve
<u>3/2539/50</u> 24 OCT 96	Soco Exploration (Thailand) Co., Ltd.	100.00	B8/38	9,584.00	-	-
<u>4/2539/51</u> 28 OCT 96	Texaco Exploration (Thailand) II Ltd.	100.00	B11/38	8,690.00	-	-
ANDAMAN SEA						
<u>1/2539/48</u> 19 JUN 96	Unocal Petroleum, Ltd. (Operator) Total Khorat Ltd. Statoil Siam Ltd.	46 2/3 33 1/3 20.00	W8/38 W9/38	23,375.00 25,428.00	-	-
ONSHORE						
<u>1/2522/16</u> 15 Mar 79	Thai Shell Exploration and Production Co., Ltd. (Operator) PTT Exploration and Production Public Co., Ltd.	75.00 25.00	S1	-	81.19	1,245.03
<u>2/2522/17</u> 16 Mar 79	Esso Exploration and Production Khorat Inc. (Operator) PTT Exploration and Production Public Co., Ltd.	80.00 20.00	E5	-	34.40	73.85
<u>1/2524/19</u> 3 Jun 81	Esso Exploration and Production Khorat Inc.	100.00	EU1	-	1.96	190.93
<u>1/2526/23</u> 12 Apr 83	Sino-U.S. Petroleum Inc. (Operator) Combined Oil and Gas (Thailand) Inc. Thai Energy Resources Ltd. Sino Thai Energy Ltd.	33.33 33.33 16.67 16.67	NC	-	11.244	-
<u>1/2527/24</u> 24 Jul 84	Cairn Energy Far East Ltd. (Operator) Monument Resources (Thailand) Ltd. Dragon (Far East) Ltd.	30.00 30.00 40.00	SW1A	-	3.97	81.32
<u>2/2528/27</u> 5 Feb 85	PTT Exploration and Production International Ltd.	100.00	PTTEP1	1,418.43	7.06	-
<u>5/2539/32</u> 1 Nov 96	Cairn Energy (Thailand) Ltd.	100.00	5643/38	2,941.00	-	-
<u>6/2539/53</u> 11 Nov 96	Amerada Hess Exploration (Thailand) Co., Ltd. (Operator) Kerr-McGee (Thailand) Ltd. Novus Exploration (Thailand) Co., Ltd.	35.00 35.00 30.00	5340/38 5440/38	2,964.00 2,964.00	-	-
<u>7/2539/54</u> 15 Nov 96	Anschutz (Thailand) Co., Ltd.	100.00	5441/38	2,957.00	-	-

Thailand Petroleum Concession Map (as of December 1996)



Exploration

Petroleum exploration activities in Thailand, both drilling and seismic works, are still active. In the year 1996, a total of 8,088 line-km of 3D seismic and 8,028 line-km of 2D seismic were carried out and 179 wells were drilled (seven exploratory, 40 appraisal and 132 development), in which four wells penetrated oil zones, three wells penetrated oil and gas zones, and 163 wells intercepted gas zones.

Summary

Operator	Block (s)	Exploratory	Drilling Appraisal	Development	Seismic Survey (line-km)	
					2D	3D
ONSHORE						
Cairn Energy	SW1A	-	1	-	-	-
Esso Khorat	E5	-	-	1	-	-
PTTEPI	PTTEP1	2	-	1	-	-
Sino US	NC	-	-	2	-	-
Thai Shell	S1	-	-	1	-	-
DMR	Northeastern Thailand	-	-	-	638	-
GULF OF THAILAND						
Unocal Thailand	B10, B11, B12, B13, B12/27	1	15	90	-	-
Total E & P	B15, B16, B17	-	11	24	1,312	-
Thaipho	Tantawan Area	-	6	13	-	-
Maersk Oil	B8/32	1	7	-	-	6,058
Texaco II	B11/32, B12/32	2	-	-	-	-
Premier Oil	B11/27	1	-	-	-	-
Thai Shell	B6/27	-	-	-	-	2,030
Songkhla Resources	B12/32	-	-	-	236	-
ANDAMAN SEA						
Unocal Petroleum	W8/38, W9/38	-	-	-	5,842	-
Total		7	40	132	8,028	8,088

Geophysical Surveys

Geophysical surveys conducted by the concessionaires in 1996 were the sum of 15,478 line-km offshore seismic surveys; 8,088 3D-seismic and 7,390 2D-seismic. The 3D-seismic acquisitions were carried out over **Benchamas North** and **Maliwan** prospects in block B8/32 by Maersk Oil, and **Nok Kaew** prospect in block B6/27 by Thai Shell, covering the areas of 342, 618 and 223 sq. km, respectively. The 2D-seismic surveys were conducted in the Gulf of Thailand by Total (block B15) and Songkhla Resources (block B12/32), and in the Andaman Sea by Unocal Petroleum (blocks W8/38 & W9/38).

Survey Type	Operator	Block	Contractor	Duration	2D (line- km)	3D
GULF OF THAILAND						
2D Seismic	Total E & P	B15	Racal Survey	12-30 Jan 96	1,312	-
2D Seismic	Songkhla	B12/32	Racal Survey	12-15 Aug 96	236	-
3D Seismic	Maersk	B8/32	Geco Prakla	15 Aug-10 Oct 96	-	6,058
3D Seismic	Thai Shell	B6/27	WGS	8-29 Oct 96	-	2,030
ANDAMAN SEA						
2D Seismic	Unocal BKK	W8/38, W9/38	Geco Prakla	29 Nov-31 Dec 96	5,842	-
Total					7,390	8,088

DMR also conducted its own gravity, magnetic and vibroseis seismic surveys in the northeastern part of Thailand with the total of 638 line-km for each survey.

Area	Contractor	Duration	Survey Type	line-km
DMR				
Northeastern Thailand	CGG	23 Nov 96-22 Jan 97	2D Seismic	638
			Magnetic	638
			Gravity	638

Drilling

A total of 179 wells, mostly located in the Gulf of Thailand, were drilled in 1996. Unocal Thailand alone drilled 106 wells with a new gas discovery in **Plamuk** structure, west of Surat field, in blocks B10 and B11. Total drilled 35 wells and concluded its second phase development drilling program. Thaipto drilled 19 wells and conducted intensive completion program on Tantanwan-A and Tantanwan-B wells in order to start producing from **Tantanwan** field in February 1997. Apart from those producers in the Gulf of Thailand, Maersk Oil, Texaco II, and Premier Oil made the efforts to discover new fields in their areas. Maersk Oil succeeded in oil & gas discovery in **Pakakrong** structure and Texaco II, now operator for block B12/32, found gas in **Bussabong** prospect. Unfortunately, Premier Oil drilled a well without success and eventually relinquished all its concession area.

Only eight wells were drilled onshore by PTTEPI (three wells), Sino-US (two wells), Cairn Energy (one well), Thai Shell (one well), and Esso Khorat (one well), without any significant new discovery.

Drilling

Well Name	Block	Duration	TD (m)	Result
ONSHORE				
Exploratory Well				
<i>Operator : PTTEPI ; Rig : Deutag T41</i>				
Hua Mai Sung-1	PTTEP1	15 May-7 Jun 96	2,337.0	Dry
Nong Krang-1	PTTEP1	28 Jun-11 Jul 96	1,887.0	Dry
Appraisal Well				
<i>Operator : Cairn Energy ; Rig : Deutag T41</i>				
Wichianburi-4	SW1A	21 Feb-13 Mar 96	1,751.0	Dry
Development Well				
<i>Operator : Thai Shell; Rig : Deutag T48</i>				
Lan Krabu-F16	S1	15 Mar-2 May 96	3,332.0	Oil
<i>Operator : PTTEPI ; Rig : Deutag T41</i>				
UT1-7/D3	PTTEP1	9-25 Jun 96	1,547.0	Oil
<i>Operator : Sino US; Rig : F250-3DH</i>				
Bung Muang 2-5	NC	2 Oct-9 Nov 96	2,866.0	Oil
Bung Ya 1-1	NC	11 Nov-31 Dec 96	2,876.0	Oil
<i>Operator : Esso; Rig : Deutag T48</i>				
Namphong-7	E5	10 Nov-31 Dec 96	1,505.7	Drilling
GULF OF THAILAND				
Exploratory Well				
<i>Operator : Unocal; Rig : Sedco 602</i>				
Plamuk-1	B10	16 Jan-4 Feb 96	3,301.0	Gas
<i>Operator : Maersk; Rig : Sedco 601</i>				
Pakakrong-1	B8/32	7-26 Feb 96	2,481.1	Oil & Gas
<i>Operator : Premier Oil; Rig : Ron Tappmeyer</i>				
Benjarong-1	B11/27	28 Apr-28 May 96	3,182.1	Dry
<i>Operator : Texaco II; Rig : Ocean General</i>				
Sontaya-1	B11/32	18 Sep-29 Oct 96	3,276.0	Dry
Bussabong-2X	B12/32	1 Nov 96-6 Jan 97	2,814.8	Gas
Appraisal Well				
<i>Operator : Maersk Oil ; Rig : Sedco 601</i>				
Benchamas-2A	B8/32	7-13 Jan 96	3,337.6	Dry
Benchamas-4	B8/32	14 Jan-7 Feb 96	2,874.3	Gas
Pakakrong-2	B8/32	27 Feb-16 Mar 96	2,616.7	Oil & Gas
Benchamas-5	B8/32	10-23 Oct 96	2,813.3	Oil & Gas
Benchamas-8	B8/32	25 Oct-25 Nov 96	3,393.6	Gas
Benchamas-10	B8/32	25 Nov-12 Dec 96	3,343.7	Gas
Benchamas-6	B8/32	13 Dec 96-9 Jan 97	3,497.9	Gas
<i>Operator : Thaipto ; Rigs : Sedco 601 & Trident 15</i>				
Tantanwan-11	B8/32	18-29 Mar 96	3,390.9	Gas
Tantanwan-10	B8/32	30 Mar-8 Apr 96	3,152.2	Gas
Tantanwan-13	B8/32	9-20 Apr 96	3,200.4	Gas
Tantanwan-14	B8/32	21 Apr-7 May 96	3,324.8	Gas
Tantanwan-15	B8/32	25 Aug-10 Sep 96	3,491.8	Gas
Tantanwan-16	B8/32	10-25 Sep 96	3,635.0	Gas
<i>Operator : Unocal Thailand ; Rigs : Energy Searcher & Sedco 602</i>				
Satun-29	B12	11-15 Jan 96	3,093.7	Gas
Trat-12	B11	5-10 Feb 96	3,171.4	Gas
Trat-13	B11	10-14 Feb 96	3,166.6	Gas
Bannpot-13	B13	16-27 Feb 96	3,156.8	Gas
Pladang-6	B11	2-10 Jan 96	3,156.2	Gas
Pladang-7	B11	28 Feb-4 Mar 96	2,922.4	Gas
Pladang-8	B11	4-9 Mar 96	3,060.2	Gas
Platong-18	B11	10-16 Mar 96	3,030.9	Gas
Platong-19	B11	26-31 Mar 96	3,090.7	Gas
Plamuk-2	B11	17-25 Mar 96	3,253.4	Gas
Pailin-21	B12/27	11-28 Sep 96	3,871.0	Gas

Drilling

Well Name	Block	Duration	TD (m)	Result
Pailin-20	B12/27	28 Sep-27 Oct 96	3,617.7	Gas
Pailin-19	B12/27	28 Oct -25 Nov 96	3,723.1	Gas
Pailin-18	B12/27	26 Nov-17 Dec 96	3,427.8	Gas
Pailin-22	B12/27	17 Dec 96-12 Jan 97	3,488.4	Gas
Operator : Total ; Rigs : Benloyal & Stena Clyde				
BK-Del-8deep-A	B15	3-29 Jan 96	3,753.0	Gas
BK-Del-8deep-B	B15	29 Jan-9 Mar 96	3,334.0	Gas
BK-Del-8deep-C	B15	9 Mar-3 Apr 96	3,333.0	Gas
BK-Del-18B	B17	5 Apr-24 May 96	3,265.0	Gas
BK-Del-4A	B17	25 May-10 Aug 96	3,774.0	Gas
BK-Del-12S	B16	12-26 Aug 96	3,200.0	Gas
BK-Del-12S(B)	B16	26 Aug-14 Sep 96	3,670.0	Gas
BK-Del-4W	B17	16 Sep-5 Oct 96	2,726.0	Gas
Ton Nok Yoong-2	B16	7-17 Oct 96	2,060.0	Gas
Ton Koon-2	B17	18-26 Oct 96	1,892.0	Gas
Ton Nok Yoong-3	B16	28 Oct-8 Nov 96	2,120.0	Gas
Development Well				
Operator : Unocal Thailand ; Rigs : Robray T-4 & Robray T-7				
Satun D-15	B12	2-8 Jan 96	3,325.7	Gas
Satun G-14	B11	30 Jun-5 Jul 96	3,210.2	Gas
Satun G-13	B11	5-11 Jul 96	3,377.2	Gas
Satun G-16	B11	11-16 Jul 96	3,778.0	Gas
Satun G-15	B11	16-20 Jul 96	3,031.5	Gas
Funan C-16	B13	21-27 Jan 96	3,689.6	Gas
Funan C-17	B13	27 Jan-1 Feb 96	3,887.1	Gas
Funan C-13	B13	1-5 Feb 96	2,872.1	Gas
Funan C-14	B13	5-8 Feb 96	3,130.3	Gas
Funan C-15	B13	8-13 Feb 96	3,537.5	Gas
Funan H-2	B13	19-26 Feb, 15-20 Jun 96	2,859.9	Gas
Funan H-3	B13	26-29 Feb, 23-30 Apr 96	3,039.8	Gas
Funan H-7	B13	30 Apr-5 May 96	3,703.3	Gas
Funan H-6	B13	5-9 May 96	3,205.6	Gas
Funan H-8	B13	9-14 May 96	3,468.0	Gas
Funan H-9	B13	14-21 May 96	3,436.9	Gas
Funan H-10	B13	21-26 May 96	3,693.0	Gas
Funan H-11	B13	26-30 May 96	2,908.1	Gas
Funan H-12	B13	30 May-3 Jun 96	3,521.7	Gas
Funan H-5	B13	3-8 Jun 96	3,369.6	Gas
Funan H-4	B13	8-15 Jun 96	3,587.5	Gas
Jakrawan C-3	B12	4-12 Aug 96	4,067.9	Gas
Jakrawan C-5	B12	12-22 Aug 96	3,874.3	Gas
Jakrawan C-2	B12	23-28 Aug 96	3,497.9	Gas
Jakrawan C-4	B12	28 Aug-4 Sep 96	3,720.0	Gas
Jakrawan C-6	B12	4-9 Sep 96	3,358.3	Gas
Jakrawan C-8	B12	9-13 Sep 96	3,098.6	Gas
Jakrawan C-9	B12	13-23 Sep 96	3,627.1	Gas
Jakrawan C-10	B12	24-27 Sep 96	3,300.1	Gas
Jakrawan C-7	B12	27 Sep-8 Oct 96	3,367.1	Gas
Jakrawan C-11	B12	8-13 Oct 96	3,766.7	Gas
Jakrawan C-12	B12	13-18 Oct 96	3,625.6	Gas
Satun E-15	B12	22-27 Oct 96	3,522.9	Gas
Satun E-16	B12	27 Oct-6 Nov 96	3,648.5	Gas
Satun E-14	B12	6-12 Nov 96	2,787.4	Gas
Satun B-15	B11	22-27 Nov 96	2,952.9	Gas
Satun B-14	B11	27 Nov-3 Dec 96	3,238.5	Gas
Satun B-17	B11	3-8 Dec 96	3,419.9	Gas
Satun B-18	B11	11-15 Dec 96	3,584.4	Gas
Satun B-16	B11	15-19 Dec 96	2,812.4	Gas
Erawan S-8	B12	28 Dec 96-3 Jan 97	3,746.0	Gas
Erawan P-18	B12	19-26 Dec 96	3,026.7	Gas
Erawan P-15	B12	26 Dec 96-2 Jan 97	3,935.3	Gas
Erawan J-21	B12	2-13 Jan 96	4,192.5	Gas
Erawan J-16	B12	13-24 Jan 96	4,080.4	Gas
Erawan J-15	B12	24-30 Jan 96	4,200.1	Gas
Erawan J-18	B12	30 Jan-6 Feb 96	4,075.8	Gas
Erawan J-17	B12	7-15 Feb 96	4,042.0	Gas
Erawan J-19	B12	15-23 Feb 96	3,529.3	Gas
Erawan J-20	B12	23 Feb-2 Mar 96	3,689.6	Gas
Erawan J-22	B12	2-10 Mar 96	3,427.8	Gas
Platong C-18	B10	23 Mar-1 Apr 96	3,622.9	Gas
Platong C-17	B10	1-6 Apr 96	3,161.1	Gas
Platong C-16	B10	6-10 Apr 96	3,627.1	Gas
Platong C-15	B10	11-16 Apr 96	2,907.8	Gas
Platong G-2	B10	23-29 Apr 96	3,442.7	Gas
Platong G-3	B10	29 Apr-5 May 96	3,040.7	Gas
Platong G-4	B10	5-10 May 96	3,272.9	Gas

Drilling

Well Name	Block	Duration	TD (m)	Result
Platong G-5	B10	10-13 May 96	3,135.2	Gas
Platong G-6	B10	13-16 May 96	3,016.0	Gas
Platong G-8	B10	16-21 May 96	3,064.8	Gas
Platong G-7	B10	21-24 May 96	3,054.1	Gas
Platong G-9	B10	24-27 May 96	2,999.5	Gas
Platong G-10	B10	27-31 May 96	3,166.9	Gas
Platong G-11	B10	1-5 Jun 96	3,464.7	Gas
Platong G-12	B10	5-9 Jun 96	3,425.3	Gas
Platong D-16	B11	15-19 Aug 96	3,014.8	Gas
Platong D-12	B11	19-23 Aug 96	3,258.3	Gas
Platong D-13	B11	23-27 Aug 96	3,265.9	Gas
Platong D-15	B11	27 Aug-1 Sep 96	3,180.9	Gas
Platong D-14	B11	1-5 Sep 96	3,345.2	Gas
Platong D-17	B11	5-9 Sep 96	3,233.3	Gas
Platong D-18	B11	9-15 Sep 96	3,210.5	Gas
Platong H-2	B10	22-29 Sep 96	3,817.6	Gas
Platong H-4	B10	29 Sep-5 Oct 96	3,870.0	Gas
Platong H-3	B10	5-7, 12-17 Oct 96	3,860.6	Gas
Platong H-5	B10	17-24 Oct 96	3,565.2	Gas
Platong H-6	B10	24 Oct-3 Nov 96	3,714.0	Gas
Platong H-7	B10	3-10 Nov 96	4,094.1	Gas
Satun H-10	B11	17-22 Jun 96	3,255.6	Gas
Satun H-11	B11	22-26 Jun 96	3,121.2	Gas
Satun H-12	B11	26-29 Jun 96	3,715.5	Gas
Satun H-13	B11	29 Jun-6 Jul 96	3,721.0	Gas
Satun K-12	B11	13-21 Jul 96	4,174.5	Gas
Satun K-14	B11	24-29 Jul 96	3,112.0	Gas
Satun K-13	B11	29 Jul-6 Aug 96	4,089.5	Gas
Satun F-14	B12	19-24 Nov 96	3,585.7	Gas
Satun F-15	B12	24-27 Nov 96	3,398.5	Gas
Satun F-13	B12	27 Nov-1 Dec 96	3,228.4	Gas
Satun F-16	B12	2-5 Dec 96	3,160.8	Gas
Operator : Thaipo ; Rig : Trident 15				
Tantawan A-9	B8/32	8-20 Jan 96	3,511.3	Gas
Tantawan A-10	B8/32	22 Jan-7 Feb 96	3,927.0	Gas
Tantawan B-3	B8/32	28 Feb-15 Mar 96	3,437.2	Dry
Tantawan B-6	B8/32	15 Mar-3 Apr 96	3,546.3	Gas
Tantawan B-4	B8/32	3-15 Apr 96	3,275.7	Gas
Tantawan B-5	B8/32	15-25 Apr 96	3,376.9	Gas
Tantawan B-7	B8/32	25 Apr-8 May 96	3,261.4	Gas
Tantawan B-8	B8/32	8-30 May 96	3,826.5	Gas
Tantawan B-3ST	B8/32	3-16 Jun 96	3,621.0	Dry
Tantawan B-3ST2	B8/32	16-28 Jun 96	3,201.6	Gas
Tantawan B-9	B8/32	28 Jun-8 Jul 96	3,547.9	Dry
Tantawan B-10	B8/32	8-19 Jul 96	3,524.7	Gas
Tantawan B-11	B8/32	19-31 Jul 96	3,694.2	Gas
Operator : Total ; Rig : Robray T-1				
BK-5-H	B15	7-12 Jan 96	2,820.0	Gas
BK-5-B	B15	12-20 Jan 96	3,843.0	Gas
BK-5-G	B15	20 Jan-2 Feb 96	3,392.0	Gas
BK-5-J	B15	2-8 Feb 96	1,982.0	Gas
BK-5-D	B15	9-22 Feb 96	3,859.0	Gas
BK-5-K	B15	22 Feb-2 Mar 96	3,455.0	Gas
BK-5-L	B15	2-11 Mar 96	3,982.0	Gas
BK-5-A	B15	11-17 Mar 96	3,570.0	Gas
BK-4-C	B15	21 Apr-1 May 96	3,157.0	Gas
BK-4-E	B15	1-10 May 96	2,908.0	Gas
BK-4-J	B15	10-20 May 96	3,350.0	Gas
BK-4-M	B15	20 May-6 Jun 96	2,550.0	Gas
BK-4-A	B15	6-14 Jun 96	3,997.0	Gas
BK-4-B	B15	14-24 Jun 96	3,400.0	Gas
BK-7-F	B15	22 Jul-7 Aug 96	3,266.0	Gas
BK-7-B	B15	7-18 Aug 96	3,663.0	Gas
BK-7-H	B15	18-27 Aug 96	2,903.0	Gas
BK-7-L	B15	27 Aug-11 Sep 96	3,680.0	Gas
BK-7-E	B15	11-22 Sep 96	3,604.0	Gas
BK-7-G	B15	22-27 Sep 96	2,075.0	Gas
BK-8-A	B15	9-22 Oct 96	3,752.0	Gas
BK-8-J	B15	22 Oct-14 Nov 96	3,835.0	Gas
BK-8-D	B15	14 Nov-6 Dec 96	3,772.0	Gas
BK-8-E	B15	8-21 Dec 96	3,590.0	Gas

Production

In the year 1996, Thailand produced 469 BCF of gas, 13.1 MMBBL of condensate, and 9.2 MMBBL of crude oil. The gas production increased by 17%, while condensate and crude oil production increased by 20.2% and 12.2%, respectively, over those of 1995. The total petroleum production of the country was equivalent to 107 MMBBL of crude oil and considered 30% of petroleum consumption in the country. Seven producer companies are Unocal Thailand, Ltd., Thai Shell Exploration and Production Co., Ltd., Esso Exploration and Production Khorat Inc., PTTEP International Ltd. (PTTEPI), Sino-U.S. Petroleum Inc., Total Exploration and Production Thailand, and Cairn Energy Far East Ltd.

Unocal Thailand and its partners produced gas and condensate from their 11 fields in the Gulf of Thailand: Erawan, Baanpot, South Satun, Satun, Platong, Kaphong, Surat, Funan, Jakrawan, Gomin, and West Jakrawan at an average rate of 808 MMCFD and 27,950 BPD, respectively. Unocal Thailand has started to produce gas and condensate from its latest field, West Jakrawan, since 5 May 1996 with the gas averaged initial flow in the first month of 42 MMCFD and associated condensate of 852 BPD.

Thai Shell produced crude oil and gas from its onshore Sirikit and nearby fields at an average rate of 18,821 BPD and 75 MMCFD, respectively. The company also produced 4,709 BPD of crude oil from a single well, Nang Nuan B-01, located in the Gulf of Thailand.

Esso Khorat produced gas from Nam Phong gas field at an average rate of 65 MMCFD where as Sino-U.S. produced oil from its Bung Muang and Bung Ya oil fields at a total rate of 436 BPD, which doubled the production rate of the previous year due to more producing wells drilled. Meanwhile, PTTEPI produced crude oil from Kamphaeng Saen and U-Thong oil fields at a total rate of 959 BPD.

Total E & P Thailand produced gas and condensate from Bongkot gas field, started in 1993, at an average rate over 1996 of 337 MMCFD and 7,824 BPD, respectively.

Cairn Energy produced crude oil mostly from Wichian Buri field, slightly from Na Sanun field, at the total rate of 274 BPD.

Based on the production plan of the operators, oil and condensate will be produced in order of 81,680 BPD and gas production will be 2.5 BCFD by the year 2001.

Remark: Net Petroleum import equals 245.6 MMBBL.

Monthly Petroleum Production in 1996

Field	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sepr	Oct	Nov	Dec	TOTAL
NATURAL GAS (MMSCF)													
Erawan	8,630.90	7,611.41	7,704.18	6,770.31	8,658.50	6,463.85	7,565.81	8,908.83	8,420.36	9,408.76	8,677.67	9,213.43	98,034.01
Baanpot	0.00	117.50	52.14	300.82	383.27	216.59	328.88	355.59	142.80	557.28	640.49	683.05	3,778.41
South Satun	346.72	644.82	1,311.46	1,466.65	1,864.72	1,365.44	1,051.41	1,786.21	1,455.65	1,965.16	1,782.60	1,862.83	16,903.66
Satun	6,192.61	4,756.08	6,269.70	6,597.51	4,502.10	6,341.40	6,696.51	5,721.44	6,293.30	7,270.40	6,618.55	6,949.26	74,208.86
Platong	1,337.08	1,106.94	874.24	1,162.07	1,373.46	1,339.23	1,407.75	1,365.19	1,733.75	2,776.44	3,097.93	3,169.45	20,743.50
Kapong	99.83	64.27	61.67	21.23	6.45	0.00	21.55	192.40	234.94	324.87	355.43	300.38	1,683.02
Surat	236.71	325.61	253.01	314.79	236.89	228.38	320.81	214.61	226.61	271.91	264.88	268.19	3,162.39
Funan	3,366.95	3,056.79	3,091.48	3,011.36	3,376.28	3,034.63	3,408.99	3,525.80	3,726.77	4,152.39	4,123.48	4,175.50	42,050.42
Jakrawan	510.44	375.72	621.84	679.67	929.55	315.27	362.21	302.07	247.95	309.90	287.63	511.85	5,454.09
West Jakrawan	0.00	0.00	0.00	0.00	967.87	1,255.47	1,217.70	1,078.45	1,026.02	1,778.47	1,915.11	1,736.56	10,975.66
Gomin	920.27	1,030.80	1,626.10	1,654.88	1,978.14	1,497.16	1,554.09	1,667.36	1,614.90	1,625.20	1,387.56	1,265.18	17,821.64
Bongkot	8,826.23	8,862.81	8,254.11	9,987.15	11,053.93	11,772.35	12,190.86	9,681.65	10,905.57	10,831.01	11,154.79	9,497.68	123,018.14
Sirikit	2,498.80	2,412.18	2,494.84	2,452.19	2,483.39	2,387.14	2,630.13	2,620.34	1,828.91	1,836.20	1,775.24	1,887.70	27,307.06
Nam Phong	1,996.88	1,881.48	1,982.11	1,872.09	2,007.34	1,948.69	2,088.39	1,998.37	1,936.22	1,952.40	1,982.25	1,991.06	23,637.28
Total	34,963.40	32,246.40	34,596.87	36,290.73	39,821.89	38,165.60	40,845.08	39,418.32	39,793.74	45,060.39	44,063.59	43,512.11	468,778.12
CONDENSATE (BBL)													
Erawan	265,508.00	232,676.00	218,304.00	208,176.00	279,424.00	197,571.00	231,633.00	265,006.00	261,161.00	276,224.00	245,201.00	246,623.00	2,927,507.00
Baanpot	0.00	4,050.00	1,400.00	8,098.00	12,302.00	8,165.00	9,857.00	13,493.00	6,257.00	21,434.00	26,653.00	28,376.00	140,085.00
South Satun	6,838.00	14,526.00	29,609.00	32,646.00	46,669.00	32,036.00	27,121.00	41,782.00	30,867.00	45,381.00	42,263.00	47,189.00	396,927.00
Satun	218,835.00	170,802.00	232,198.00	234,544.00	155,979.00	214,190.00	225,050.00	196,972.00	217,611.00	260,265.00	226,134.00	188,766.00	2,541,346.00
Platong	64,372.00	48,626.00	44,297.00	58,506.00	66,488.00	63,314.00	61,325.00	68,826.00	81,284.00	120,072.00	135,825.00	160,252.00	973,187.00
Kapong	3,808.00	4,010.00	4,071.00	2,970.00	1,053.00	0.00	1,288.00	5,089.00	7,902.00	11,095.00	11,439.00	39,255.00	91,980.00
Surat	14,442.00	17,474.00	8,967.00	9,522.00	9,599.00	9,808.00	13,144.00	8,750.00	9,181.00	8,172.00	9,456.00	10,571.00	129,086.00
Funan	121,842.00	107,358.00	94,814.00	103,522.00	117,042.00	102,997.00	137,736.00	142,171.00	143,475.00	146,868.00	124,063.00	105,321.00	1,447,209.00
Jakrawan	7,594.00	6,290.00	7,706.00	6,690.00	7,363.00	5,805.00	6,123.00	4,296.00	3,601.00	5,289.00	4,267.00	38,498.00	103,522.00
West Jakrawan	0.00	0.00	0.00	0.00	15,693.00	25,572.00	22,967.00	20,994.00	17,962.00	35,842.00	36,269.00	50,174.00	225,473.00
Gomin	81,396.00	86,578.00	119,077.00	136,642.00	163,012.00	115,278.00	103,065.00	109,137.00	86,880.00	78,888.00	70,164.00	75,449.00	1,225,566.00
Bongkot	180,583.00	173,795.00	173,015.00	161,946.00	194,881.00	214,942.00	231,454.00	286,275.00	296,975.00	299,723.00	327,879.00	314,482.00	2,855,950.00
Total	965,218.00	866,185.00	933,458.00	963,262.00	1,069,505.00	989,678.00	1,070,763.00	1,162,791.00	1,163,156.00	1,309,253.00	1,259,613.00	1,304,956.00	13,057,838.00
CRUDE OIL (BBL)													
Sirikit	561,726.00	538,467.00	573,295.00	559,400.00	595,201.00	571,401.00	595,769.00	589,226.00	555,464.00	548,925.00	568,778.00	611,897.00	6,869,549.00
Nang Nuan	111,784.00	101,025.00	139,436.00	149,346.00	122,348.00	73,326.00	201,408.00	141,190.00	169,591.00	170,557.00	153,777.00	184,912.00	1,718,700.00
Kampaeng Saen	2,340.13	1,632.67	1,505.68	1,343.68	1,409.29	1,274.32	1,681.89	2,373.59	2,660.18	2,855.00	1,430.00	1,631.92	22,138.35
U-Thong	30,156.54	30,239.99	31,294.45	30,001.18	29,911.18	17,141.86	28,683.28	23,741.87	24,357.14	28,779.00	27,311.00	26,244.81	327,862.30
Bung Ya	0.00	0.00	0.00	0.00	604.04	604.04	1,733.14	1,705.42	1,580.53	1,535.00	1,591.00	1,616.04	10,365.17
Bung Muang	16,770.24	14,640.57	17,136.67	15,120.00	14,367.00	12,655.37	12,427.26	10,484.31	9,522.52	10,178.00	9,137.00	6,168.16	148,607.10
Wichienburi	9,817.31	9,177.00	9,597.00	8,855.84	8,614.35	8,443.81	8,571.84	8,460.74	7,683.28	8,236.00	6,323.00	6,124.00	99,904.17
Na Sanun	0.00	0.00	0.00	0.00	59.00	0.00	0.00	0.00	0.00	112.00	0.00	0.00	171.00
Total	732,594.22	695,182.23	772,264.80	764,066.70	771,909.82	684,846.40	850,274.41	777,181.93	770,858.65	771,177.00	768,347.00	838,593.93	9,197,297.09
LPG (TONS)													
Sirikit	8,955.00	8,449.00	8,874.00	8,487.00	9,367.00	9,022.00	9,037.00	9,094.00	8,755.00	9,183.00	8,815.00	8,958.00	106,996.00
Total	8,955.00	8,449.00	8,874.00	8,487.00	9,367.00	9,022.00	9,037.00	9,094.00	8,755.00	9,183.00	8,815.00	8,958.00	106,996.00

Forecast of Gas Production in Thailand

Company	Blocks	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
OFFSHORE											
Unocal Thailand	B10, B11, B12, B13, B12/27	970	1,030	1,165	1,165	1,290	1,330	1,330	1,330	1,330	1,330
Thaipo	B8/32	75	85	125	140	100	95	95	125	70	70
Total Thailand	B15, B16, and B17	400	500	500	500	600	600	600	600	600	600
JDA	B17, A19	0	0	0	250	400	650	650	650	650	650
TOTAL OFFSHORE		1,445	1,615	1,790	2,055	2,390	2,675	2,675	2,705	2,650	2,650
ONSHORE											
Thai Shell	S1	70	70	60	55	55	52	47	47	46	42
Esso Khorat	E5	64	64	64	64	64	64	64	55	51	48
TOTAL ONSHORE		134	134	124	119	119	116	111	102	97	90
GRAND TOTAL		1,579	1,749	1,914	2,174	2,509	2,791	2,786	2,807	2,747	2,740

Unit = MMCFD

Forecast of Oil and Condensate Production in Thailand

Company	Blocks	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
OFFSHORE											
Unocal Thailand	B10, B11, B12, B13, B12/27	29,710	29,350	31,020	29,880	32,800	33,800	34,530	33,960	35,640	36,700
Thaipo	B8/32	8,300	8,950	9,440	16,760	19,230	13,670	16,720	13,450	16,270	15,800
Total Thailand	B15, B16, and B17	7,000	7,500	7,500	7,500	9,000	9,000	9,000	9,000	9,000	9,000
JDA		0	0	0	3,000	4,800	7,800	7,800	7,800	7,800	7,800
TOTAL OFFSHORE		45,010	45,800	47,960	57,140	65,830	64,270	68,050	64,210	68,710	69,300
ONSHORE											
Thai Shell	S1	18,000	18,000	18,000	16,000	15,000	12,000	10,000	9,000	8,000	7,500
PTTEPI	PTTEP1	1,000	900	800	700	600	600	500	400	300	200
Sino-U.S.	NC	400	300	250	200	150	100	0	0	0	0
Cairn Energy	SW1A	300	300	200	100	100	0	0	0	0	0
TOTAL ONSHORE		19,700	19,500	19,250	17,000	15,850	12,700	10,500	9,400	8,300	7,700
GRAND TOTAL		64,710	65,300	67,210	74,140	81,680	76,970	78,550	73,610	77,010	77,000

Unit = BPD

Petroleum Reserves

The total petroleum reserves of Thailand are revised annually, using the latest exploration and production information at year-end. The new estimated reserve of every category was updated from the data as of January 1, 1997.

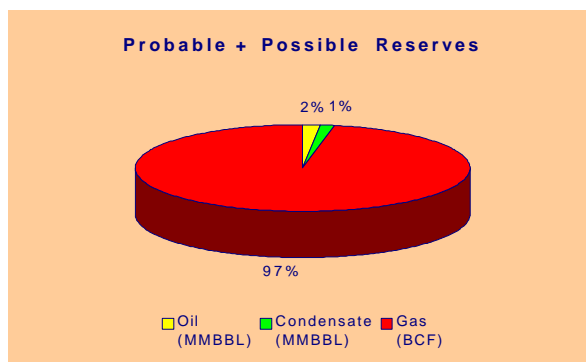
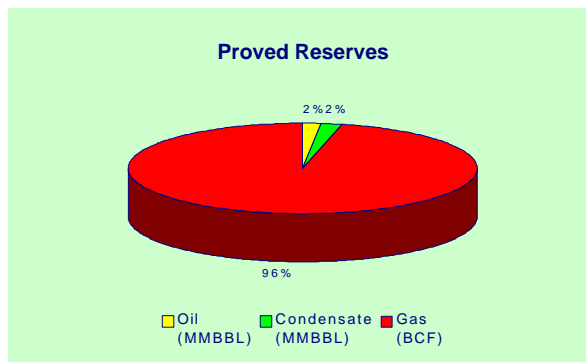
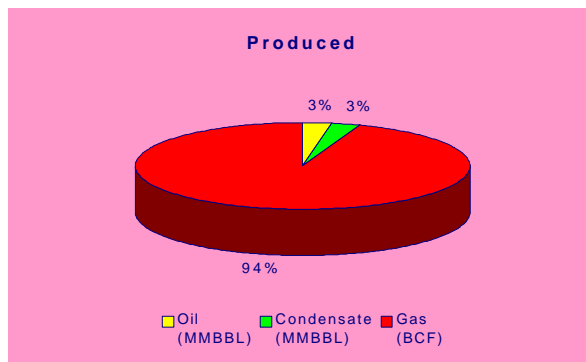
All the reserve terminology used in the report are after the Society of Petroleum Engineers (SPE) classification, proved, probable, and possible reserves according to the degree of certainty.

Natural gas, the largest portion of domestic petroleum supplies, retained its highest proportion as new discoveries have been verified. The total proved and probable + possible reserves were updated as 6,637.654 and 14,144.898 BCF, respectively.

Condensate, the gas-associated fuel particularly found offshore, were estimated at 125.787 and 208.319 MMBBL for proved and probable + possible reserves, respectively.

Crude oil were calculated to the total of 115.329 MMBBL for proved reserves and 242.415 MMBBL for probable + possible reserves.

Petroleum Reserves of Thailand (as of January 1, 1997)

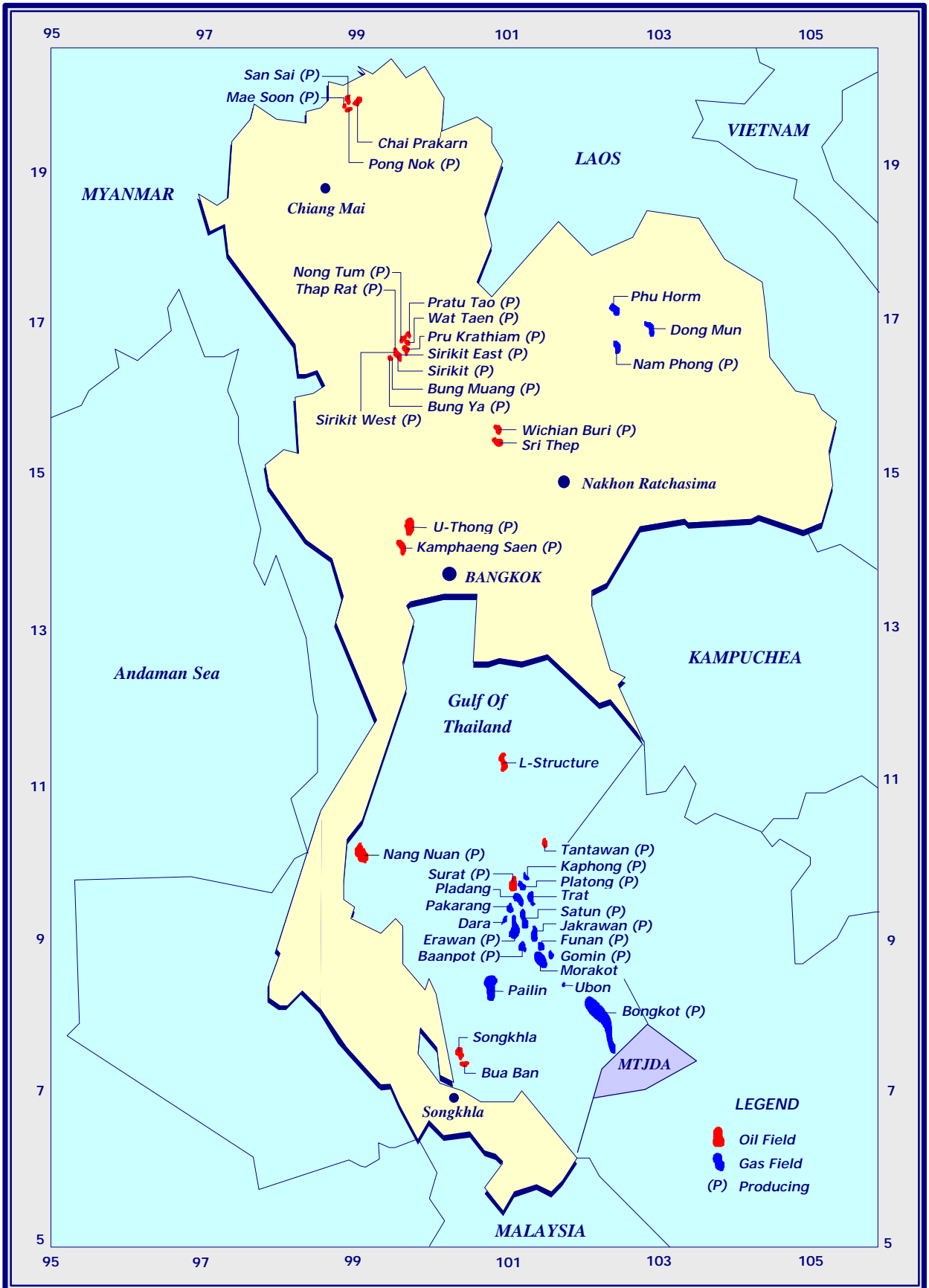


Thailand Petroleum Reserves (as of January 1, 1997)

No	Field	Basin	Concession Block	Produced			Proved Reserves			Probable + Possible Reserves		
				Oil (MMBBL)	Condensate (MMBBL)	Gas (BCF)	Oil (MMBBL)	Condensate (MMBBL)	Gas (BCF)	Oil (MMBBL)	Condensate (MMBBL)	Gas (BCF)
Gulf of Thailand												
1	Erawan	Pattani	B12-B13	-	41.85	1,226.94	-	20.77	722.87	-	5.93	178.00
2	Baanpot	Pattani	B13	-	4.01	95.83	-	0.31	19.02	-	4.67	132.00
3	Satun	Pattani	B11-B12	-	27.63	883.87	-	14.62	515.29	-	6.00	204.40
4	Platong	Pattani	B10-B11	-	11.18	220.67	-	4.37	106.46	-	4.70	99.10
5	Kapong	Pattani	B10	-	2.91	70.15	-	0.14	5.82	-	0.57	15.10
6	Gomin	Pattani	B11	-	-	-	-	-	-	-	-	-
7	Funan	Pattani	B13	-	-	-	-	-	-	-	-	-
8	Jakrawan	Pattani	B12-B13	-	-	-	-	-	-	-	-	-
9	Surat	Pattani	B10	-	13.60	323.80	-	21.50	846.40	-	32.20	1,066.20
10	Pakarang	Pattani	B11	-	-	-	-	-	-	-	-	-
11	Trat	Pattani	B11	-	-	-	-	-	-	-	-	-
12	Dara	Pattani	B12	-	-	-	-	-	-	-	-	-
13	Plamuk	Pattani	B10	-	-	-	-	-	-	-	3.49	73.50
14	Pladang	Pattani	B11	-	-	-	-	2.27	71.93	-	0.90	28.61
15	Yala	Pattani	B11	-	-	-	-	-	-	-	2.66	71.00
16	Bongkot	Malay	B15-B16	-	6.20	309.80	-	35.70	2,480.20	-	49.00	3,265.00
17	JDA	Malay	B17-B18-B19	-	-	-	-	-	-	-	62.00	6,400.00
18	Nang Nuan	Chumpon	B6/27	4.15	-	-	0.21	-	-	3.12	-	-
19	L-Structure	Pattani	B5-B6	-	-	-	-	-	-	21.70	-	-
20	Songkhla	Songkhla	OPEN	-	-	-	-	-	-	31.04	-	4.32
21	Bua Ban	Songkhla	OPEN	-	-	-	-	-	-	16.85	-	2.34
22	Morakot	Pattani	B12/27	-	-	-	-	-	-	-	-	-
23	Pailin	Pattani	B12/27	-	-	-	-	23.70	949.00	-	26.00	1,038.00
24	Ubon	Pattani	B12/27	-	-	-	-	-	-	-	-	-
25	Tantawan	Pattani	B8/32	-	-	-	27.16	-	204.88	71.73	-	881.33
26	Benchamas	Pattani	B8/32	-	-	-	12.60	2.40	103.70	61.10	10.20	456.10
Khorat Plateau												
27	Nam Phong	Khorat	E5	-	-	130.20	-	-	353.90	-	-	44.80
28	Phu Horm	Khorat	EU1	-	-	-	-	-	-	-	-	100.00
Central Plain												
29	Sirikit et al.	Phitsanulok	S1	96.60	-	452.10	67.70	-	258.20	32.60	-	85.10
30	Bung Ya & Bung Muang	Phitsanulok	NC	0.34	-	-	2.88	-	-	1.93	-	-
31	Kampaeng Saen & U-Thong	Kampaeng Saen & Suphan Buri	PTTEP1	2.20	-	-	1.50	-	-	1.20	-	-
32	Wichian Buri	Phetchabun	SW1A	0.15	-	-	0.77	-	-	-	-	-
33	Sri Thep	Phetchabun	SW1A	-	-	-	0.35	-	-	0.25	-	-
34	Na Sanun	Phetchabun	SW1A	0.00	-	-	0.64	-	-	0.90	-	-
Northern Intermontane												
35	Fang	Fang	DED	4.96	-	-	1.53	-	-	-	-	-
Total				108.40	107.38	3,713.36	115.33	125.79	6,637.65	242.42	208.32	14,144.90

Data from PTTEP, DED, and DMR

Petroleum Fields in Thailand



Granted Petroleum Production Areas in Thailand (as of December 1996)

Operator Concession No.	No.	Production Area Name	Block	Area (sq. km)	Issued Date	
GULF OF THAILAND						
Unocal Thailand 1/2515/5	1	Platong Area 1	B10	49.4800	29 Oct 82	
	2	Kaphong Area 2	B10	32.8000	24 Oct 83	
	3	Platong Area	B10	0.2500	04 Dec 84	
	4	Kaphong Area 2-Extension	B10	17.0000	17 May 89	
	5	Surat Area 3	B10	7.5800	08 Apr 91	
	6	Platong F Platform	B10	1.7540	22 Apr 94	
	7	Surat Area 5	B10	1.9920	27 May 94	
		Subtotal		110.8560		
	8	North Pladang Area 2	B11	2.0000	29 Oct 82	
	9	Pladang Area 3	B11	40.2400	29 Oct 82	
	10	Satun Area 1	B11	3.2200	29 Oct 82	
	11	Platong Area 2	B11	11.0900	29 Oct 82	
	12	Trat Area 5	B11	2.0000	11 Jan 83	
	13	Pakarang Area 6	B11	2.0000	11 Jan 83	
	14	Platong Area 2-Extension	B11	1.7500	04 Dec 84	
	15	Satun Area 1-Extension	B11	20.5300	27 Dec 84	
	16	Platong Area 7	B11	9.7030	25 Dec 87	
	17	North Satun	B11	20.2380	30 Mar 92	
	18	Platong F Platform	B11	6.0260	22 Apr 94	
		Subtotal		118.7970		
Unocal Thailand 2/2515/6	19	Erawan Area 1	B12	109.1600	26 Dec 79	
	20	Erawan Area 2	B12	31.6700	24 Feb 81	
	21	Satun Area 3	B12	53.9800	29 Oct 82	
	22	Erawan Area 1-2-Extension	B12	17.9600	03 May 84	
	23	Erawan Area 1-Extension	B12	15.2100	03 May 84	
	24	Satun Area 3-Extension (1)	B12	16.2800	27 Dec 84	
	25	Satun Area 3-Extension (2)	B12	22.0500	27 Dec 84	
	26	Erawan Area-Extension (1)	B12	57.6000	29 Apr 85	
	27	Erawan Area 1-Extension (M)	B12	10.5600	11 Apr 88	
	28	Erawan Area 1-Extension (N)	B12	4.0000	13 Oct 88	
	29	Jakrawan Area 4	B12	3.2300	15 Nov 89	
	30	Satun Area 5	B12	10.3500	18 May 90	
	31	Erawan Area 1-Extension (P)	B12	2.3200	09 Aug 90	
	32	Satun Area 6	B12	18.5900	29 Oct 90	
	33	Erawan Area 1-Extension (R & Q)	B12	25.5030	03 Nov 93	
	34	Funan G	B12	2.891	10 Apr 94	
	35	Erawan S & T Platforms	B12	30.9889	22 Nov 94	
	36	Jakrawan B, C & D	B12	50.1730	04 Mar 96	
			Subtotal		482.5159	
		37	Erawan Area 1	B13	5.4200	26 Dec 79
38		Baanpot Area 2	B13	35.4300	29 Oct 82	
39		Funan Area 4	B13	2.0000	11 Jan 83	
40		Baanpot Area 3	B13	7.9900	14 Dec 83	
41		Erawan Area 1-N-Extension	B13	7.3200	29 Apr 85	
42		Erawan Area 1-Extension (s)	B13	1.6900	03 Oct 86	
43		Baanpot Area 5	B13	2.5360	20 Aug 87	
44		Baanpot Area 5-Extension	B13	11.0000	26 Feb 88	
45		Jakrawan Area 3	B13	12.7100	15 Nov 89	
46		Funan Area 4-Addition	B13	99.0610	28 Aug 91	
47		Jakrawan Area 6	B13	1.9380	06 Oct 93	
48		Funan G	B13	10.4240	10 Apr 94	
49		Gomin A & B Area 8	B13	20.1090	07 Oct 95	
50		Funan H & I	B13	23.0570	22 Apr 96	
		Subtotal		240.6850		
Unocal Thailand 1/2529/33	51	Pailin Area 1	B12/27	452.6200	05 Jan 94	
Thai Shell 3/2528/28	52	Nang Nuan A02	B6/27	2.0000	24 Nov 87	
	53	Nang Nuan B01	B6/27	2.0000	10 Feb 93	
		Subtotal		4.0000		
Total 3/2515/7	54	Bongkot 16B	B16	280.0000	18 Mar 83	
	55	Bongkot 16E	B16	40.0000	17 May 83	
		Subtotal		320.0000		
Total 5/2515/9	56	Bongkot 17E	B17	105.0000	17 May 83	
	57	Bongkot 15B	B15	254.0000	16 Aug 82	
Thaipo Ltd. 1/2534/36	58	Tantawan	B8/32	274.6670	23 Aug 93	
Total Offshore				2,363.1409		
ONSHORE						
Thai Shell 1/2522/16	1	Sirikit	S1	25.0000	11 Jan 83	
	2	Sirikit F01	S1	10.7000	13 May 83	
	3	Sirikit South	S1	14.7500	20 Aug 84	
	4	Sirikit West	S1	2.9120	09 Oct 84	
	5	Pru Krathiam	S1	16.1172	15 Dec 86	

Granted Petroleum Production Areas in Thailand (as of December 1996)

Operator Concession No.	No.	Production Area Name	Block	Area (sq. km)	Issued Date
	6	Wat Taen	S1	2.0000	04 Mar 88
	7	Thap Rat	S1	1.9490	27 Jan 89
	8	Nong Tum	S1	1.9733	23 Feb 89
	9	Pratu Tao	S1	1.9954	24 Mar 89
	10	Sirikit East	S1	1.9300	10 Feb 93
	11	Nong Makhaam E	S1	1.8600	10 Apr 93
		Subtotal		81.1869	
ESSO 2/2522/17	12	Nam Phong	E5	34.4000	05 Feb 88
ESSO 1/2524/19	13	Phu Horm-1	EU1	1.9600	15 May 89
Sino-U.S. Petroleum Inc. 1/2526/23	14	Bung Ya Structure	NC	5.4189	01 Oct 90
	15	Bung Muang-2	NC	1.9970	05 Jan 94
	16	Bung Muang & Bung Ya Area I	NC	0.8780	07 Dec 96
	17	Bung Muang & Bung Ya Area II	NC	1.9880	07 Dec 96
	18	Bung Muang & Bung Ya Area III	NC	0.8690	07 Dec 96
		Subtotal		11.1509	
Cairn Energy Far East 1/2527/24	19	Wichian Buri	SW1A	2.0000	24 Jan 92
	20	Na Sanun	SW1A	1.9720	05 Dec 95
		Subtotal		3.9720	
PTTEP 2/2538/27	21	U-Thong	PTTEP1	2.0000	10 Aug 90
	22	Kamphaeng Saen	PTTEP1	5.0600	10 Aug 90
		Subtotal		7.0600	
		Total Onshore		139.7298	
GRAND TOTAL	81			2,502.8707	

Source: Petroleum Assessment and Development Section, Mineral Fuels Division, DMR.

Activities in The Malaysia-Thailand Joint Development Area (JDA)

After the Production Sharing Contracts had been awarded to two groups of Contractors by the Malaysia-Thailand Joint Authority (MTJA) in April 1994, a total of 15 wells were drilled in the JDA; six gas fields were discovered and confirmed by the end of 1996. They are the Cakerawala, Suriya, Bulan and Bumi fields in block A-18, and the Muda and Tapi fields in block B-17.

The activities in 1996 for the JDA are as follows:

Block A-18, Carigali-Triton Operating Sdn. Bhd. (CTOC) as the operator for block A-18 acquired 3D seismic survey covering an area of 535 sq. km over Suriya and Bumi gas field areas and drilled six exploration and appraisal wells.

Block B-17, Carigali-PTTEPI Operating Sdn. Bhd (CPOC) as the operator for blocks B-17 and C-19 acquired 3D seismic survey covering an area of 1,105 sq. km over Muda and Tapi gas field areas and drilled two appraisal wells.

Under the Production Sharing Contracts, if the Contractors discover hydrocarbon in commercial quantity in the contract area, they are required to submit a development plan to MTJA for approval before they can proceed with the works and investment on the oil or gas field development. For gas development, the MTJA and the Contractors, together, shall negotiate for the sale of natural gas to prospective buyers, on a joint-dedicated basis.

The Contractors of block A-18 have submitted a plan to develop the Cakerawala gas field with a target of bringing gas into production before the year 2000. In this connection, MTJA and the contractors have initiated a gas sale/marketing discussion with potential buyers of the JDA's gas.

With strong endorsement of the two Governments, Petroleum Authority of Thailand (PTT) and Petroliaam Nasional Berhad (PETRONAS) of Malaysia, have signed a Memorandum of Intent to jointly undertake to buy gas from the JDA.

Two Memorandums of Understanding (MOU) on the sale and purchase of natural gas from the JDA between sellers and buyers were also signed on 30 May 1996.

The first MOU was signed between MTJA and its contractors in block A-18, Petronas Carigali (JDA) Sdn. Bhd, and Triton Oil Company of Thailand, as the sellers of natural gas in block A-18 of the JDA, and the Petroleum Authority of Thailand (PTT) and Petroliaam Nasional Berhad (PETRONAS), as the buyers. The MOU lay the guideline and groundwork for all parties to negotiate and finalize the Gas Sales Agreement with an aim of bringing natural gas in block A-18 into production by the year 1999.

The second and similar MOU was also signed between MTJA and its contractors of blocks A-17 and C-19, PTTEP International Ltd. and Petronas Carigali (JDA) Sdn. Bhd., as the sellers of natural gas in blocks B-17 and C-19 of the JDA, and PETRONAS and PTT, as the buyers. The target of gas production from these blocks is set for early in the year 2000.

Discussions to conclude Gas Sales Agreements between the sellers, (MTJA/contractors) and the buyers, (PTT/PETRONAS) were still ongoing.

Petroleum Wells Drilled in JDA in 1996

Well Name	Operator	Block	Rig	Duration	Total Depth (ft)	Result	
						gas (MMCFD)	Condensate (BPD)
Cakerawala-2	CTOC	A-18	FALCON	10 March - 4 June 96	9,650	31	576
Cakerawala-3	CTOC	A-18	ACTINIA	25 March - 23 July 96	9,814	47	225
Suriya-2	CTOC	A-18	FALCON	20 July - 10 Sept. 96	8,315	56	268
Bulan-1	CTOC	A-18	FALCON	4 June - 17 July 96	7,140	36	123
Bumi-1	CTOC	A-18	ACTINIA	24 July - 22 Nov. 96	9,279	73	305
Bulan-2	CTOC	A-18	FALCON	17 Sept. - 10 Nov. 96	9,160	30	185
Muda-2	CPOC	B-17	ACTINIA	29 Nov. 96 - 28 Jan. 97	7,865	35	194
Muda-3	CPOC	B-17	FALCON	13 Nov. 96 - 20 Jan. 97	9,656	22	259

Coal Activities in Thailand

Introduction

Coal, found in Thailand as lignite and sub-bituminous, has played an important role as a main alternative energy source for decades. Coal has been used mainly as fuel in power generation, cement industry, food industry and tobacco-curing process. Due to the rapid growth in demand during the past decade, the Department of Mineral Resources (DMR), which is responsible for coal exploration, has set up the Coal Exploration & Assessment Project (CEP) in 1987 to assess the coal resource and plan the exploration for coal deposits in more than 70 Tertiary coal-bearing basins throughout the country.

Thus, under the Sixth National Economic and Social Development (NESD) Plan (1987-1991), 12 out of 14 explored basins with total measured resources of 816.53 million tons were defined as high coal-potential areas and considered for bidding. A feasibility study for power-generation purpose was also carried out.

During the Seventh NESD Plan (1992-1996), eight more high coal-potential areas were discovered with an additional measured resources of 53.52 million tons. This mounts up the total measured resources to 870.05 million tons.

High Coal-Potential Areas Investigated by DMR During 1987-1996

Basin Name	Province	Coal Resources ¹		Coal Rank
		Measured	Indicated	
Northern Region				
Wiang Haeng	Chiang Mai	93.02	34.12	Lignite to Sub-bituminous
Chae Hom	Lampang	15.78	39.82	Lignite to Sub-bituminous
<i>Hang Chat</i> ²	<i>Lampang</i>	<i>10.32</i>	<i>28.26</i>	<i>Lignite to Sub-bituminous</i>
Mae Tha	Lampang	25.24	74.07	Lignite to Sub-bituminous
Muang Pan	Lampang	0.51	1.54	Lignite to Sub-bituminous
Ngao	Lampang	48.40	50.70	Lignite to Sub-bituminous
Serm Ngam	Lampang	6.19	13.20	Lignite to Sub-bituminous
Wang Nua	Lampang	9.01	21.16	Lignite to Sub-bituminous
<i>Mae Chang</i> ²	<i>Lampang</i>	<i>2.01</i>	<i>2.99</i>	<i>Lignite to Sub-bituminous</i>
Chiang Muan	Phayao	62.47	0.00	Lignite to Sub-bituminous
<i>Mae Lamao</i> ²	<i>Tak</i>	<i>13.97</i>	<i>20.24</i>	<i>Lignite to Sub-bituminous</i>
Mae Ramat	Tak	99.58	39.52	Lignite to Sub-bituminous
<i>Pa La Tha</i> ²	<i>Tak</i>	<i>4.63</i>	<i>10.15</i>	<i>Lignite to Sub-bituminous</i>
<i>Um Phang</i> ²	<i>Tak</i>	<i>3.42</i>	<i>6.83</i>	<i>Lignite to Sub-bituminous</i>
Southern Region				
Sin Pun	Nakhon Si Thammarat	91.06	0.00	Lignite to Sub-bituminous
Khian Sa	Surat Thani	15.41	40.02	Lignite to Sub-bituminous
Saba Yoi	Songkhla	349.86	254.89	Lignite
<i>Kantang</i> ²	<i>Trang</i>	<i>3.42</i>	<i>10.26</i>	<i>Lignite to Sub-bituminous</i>
Central Region				
<i>Nong Ya Plong</i> ²	<i>Phetchaburi</i>	<i>4.49</i>	<i>8.68</i>	<i>Lignite to Sub-bituminous</i>
<i>Nong Phlub</i> ²	<i>Prachuap Khirikhan</i>	<i>11.26</i>	<i>3.64</i>	<i>Lignite to Sub-bituminous</i>
Total Resources		870.05	660.09	

Remarks: ¹ Unit in million tons. ² Additional high coal-potential areas investigated during 1992-1996.

Coal Exploration

The coal exploration carried out by DMR since 1987 resulted in the discovery of 20 high coal-potential areas with the total measured resources of 870.05 million tons.

Coal Production

The production history of coal in Thailand dated back to 1955 when the Mae Moh, an open-pit mine located in the North, initially produced 22,118 tons of lignite. This followed by the production of 4,384.4 tons of lignite from the Krabi mine in the South in 1964. Lignite from these two basins was solely used for electricity generation. Only Mae Moh mine is still running by the Electricity Generating Authority of Thailand (EGAT).

Coal Activities in Thailand 1995 suspended early this year and an underground coal gasification was being studied.

To date, in addition to EGAT (a state enterprise), local private sectors have taken part in the production of coal from other basins throughout Thailand. These basins are Li, Mae Than, Mae Lamao, Mae Chaem, Bo Luang, and Na Duang. The main productive basins are Li, Mae Than and Mae Chaem. Early this year, Nong Ya Plong basin was reopened after 5 years suspending and part of Chiang Muan basin was also being mined.

In 1996, domestic coal production was 17.6 million tons (Jan.-Oct.), approximately 13.5% higher than last

year. About 75% of the total production came from EGAT's mines.

Current Coal Production Areas in Thailand

Basin Name	Location Province	Reserve ¹		Coal Rank	Age	Current Status
		Produced ²	Remaining ²			
Northern Region						
Mae Chaem	Chiang Mai	1.683	NA	Sub-bituminous to Bituminous	Tertiary	Active
Bo Luang	Chiang Mai	0.522	NA	Sub bituminous to Bituminous	Tertiary	Active
Mae Tip	Lampang	0.880	10.120	Lignite to Bituminous	Tertiary	Suspended
Mae Than	Lampang	6.589	28.411	Lignite to Bituminous	Tertiary	Active
Mae Moh	Lampang	119.418	1,288.582	Lignite to Sub-bituminous	Tertiary	Active
Li	Lamphun	24.554	3.446	Lignite to Bituminous	Tertiary	Active
Chiang Muan	Phayao	0.142	NA	Lignite to Bituminous	Tertiary	Active
Mae Tun	Tak	0.323	0.907	Lignite to Bituminous	Tertiary	Suspended
Mae Lamao	Tak	0.718	0.912	Lignite to Bituminous	Tertiary	Active
Central Region						
Nong Ya Plong	Phetchaburi	0.494	0.906	Lignite to Bituminous	Tertiary	Active
Southern Region						
Krabi	Krabi	7.922	112.078	Lignite to Sub-bituminous	Tertiary	Suspended
Kan Tang	Trang	0.010	NA	Lignite	Tertiary	Suspended
Northeastern Region						
Na Duang	Loei	0.154	NA	Anthracite	Pre-Tertiary	Active
Na Klang	Udon Thani	0.006	NA	Anthracite	Pre-Tertiary	Suspended
Total Reserve		163.42	1,445.36			

Remarks: ¹ Unit in million tons. ² Data up to October 1996.

Coal Consumption

The main usage of indigenous coal is for power generation. About 79% of produced coal has been fed to mine-mouth power plants. EGAT consumed around 13.6 million tons of coal in 1996 (Jan.-Oct.). The rest of the produced coal, mostly sub-bituminous, is used as fuel in industrial sectors, such as cement manufacturing (15.92%), paper mill (2.85%), fiber factory (0.7%), calcium oxide making process (0.35%), and tobacco-curing (0.22%).

Domestic coal production has been growing drastically during the past ten years. However, imported coal demand is still high. The industrial sector, especially the cement industry, needs imported coal for blending with low calorific domestic coal. More coal-fired kilns have been introduced in the cement industry. High demand for imported coal is expected to continue to the year 2000 due to the steady growth of the cement industry and the introduction of power plants under EGAT's Independent Power Producers (IPP) scheme. Thailand imported about 2.85 million tons of coal and coal products during January to October 1996.

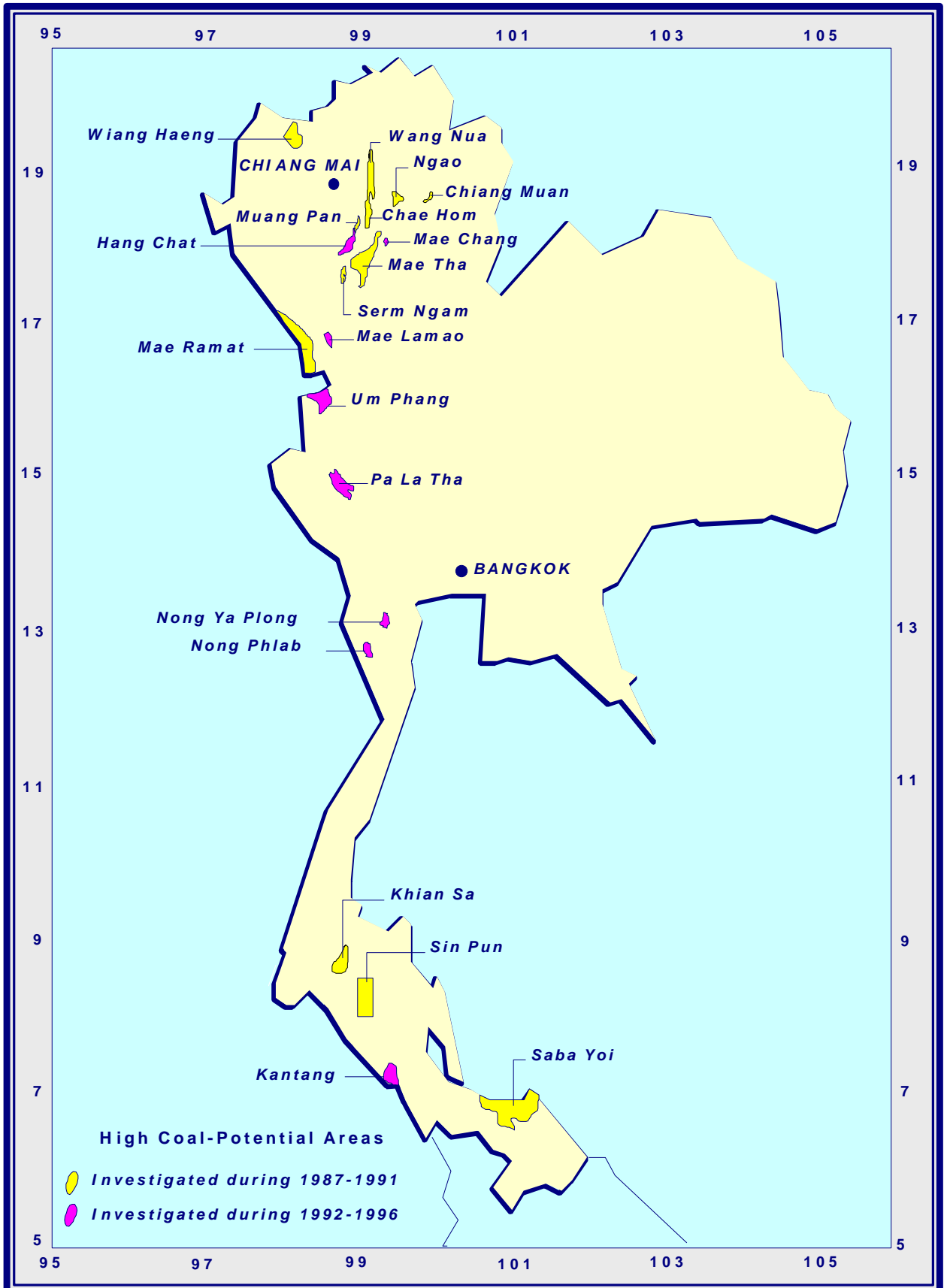
Coal Consumption in Thailand

Year	Elec- tricity	Tobacco - Curing	Demand ¹			Supply ¹			Total Supply	
			Cement	Others	Total Demand	Electricity Local	Electricity Imported	Other Industry Local		Other Industry Imported
1987	5.72	0.07	0.98	0.29	7.06	5.75	-	1.14	0.31	7.20
1988	5.89	0.04	1.17	0.43	7.53	5.95	-	1.34	0.36	7.65
1989	6.77	0.10	1.53	0.48	8.88	6.86	-	2.05	0.45	9.36
1990	9.87	0.12	2.30	0.76	13.05	9.81	-	2.55	0.34	12.70
1991	10.45	0.13	2.78	0.37	13.73	11.76	-	2.95	0.52	15.23
1992	11.94	0.12	4.07	0.40	16.53	12.42	-	3.22	0.54	16.18
1993	11.49	0.13	2.94	1.19	15.75	11.37	-	4.07	1.05	16.49
1994	12.16	0.01	4.56	1.79	18.52	12.16	-	4.85	1.53	18.54
1995	13.59	0.08	5.56	1.58	20.81	13.59	-	5.71	2.42	21.72
1996 ²	13.55	0.04	5.29	1.10	19.98	13.38	-	4.25	2.85	20.48

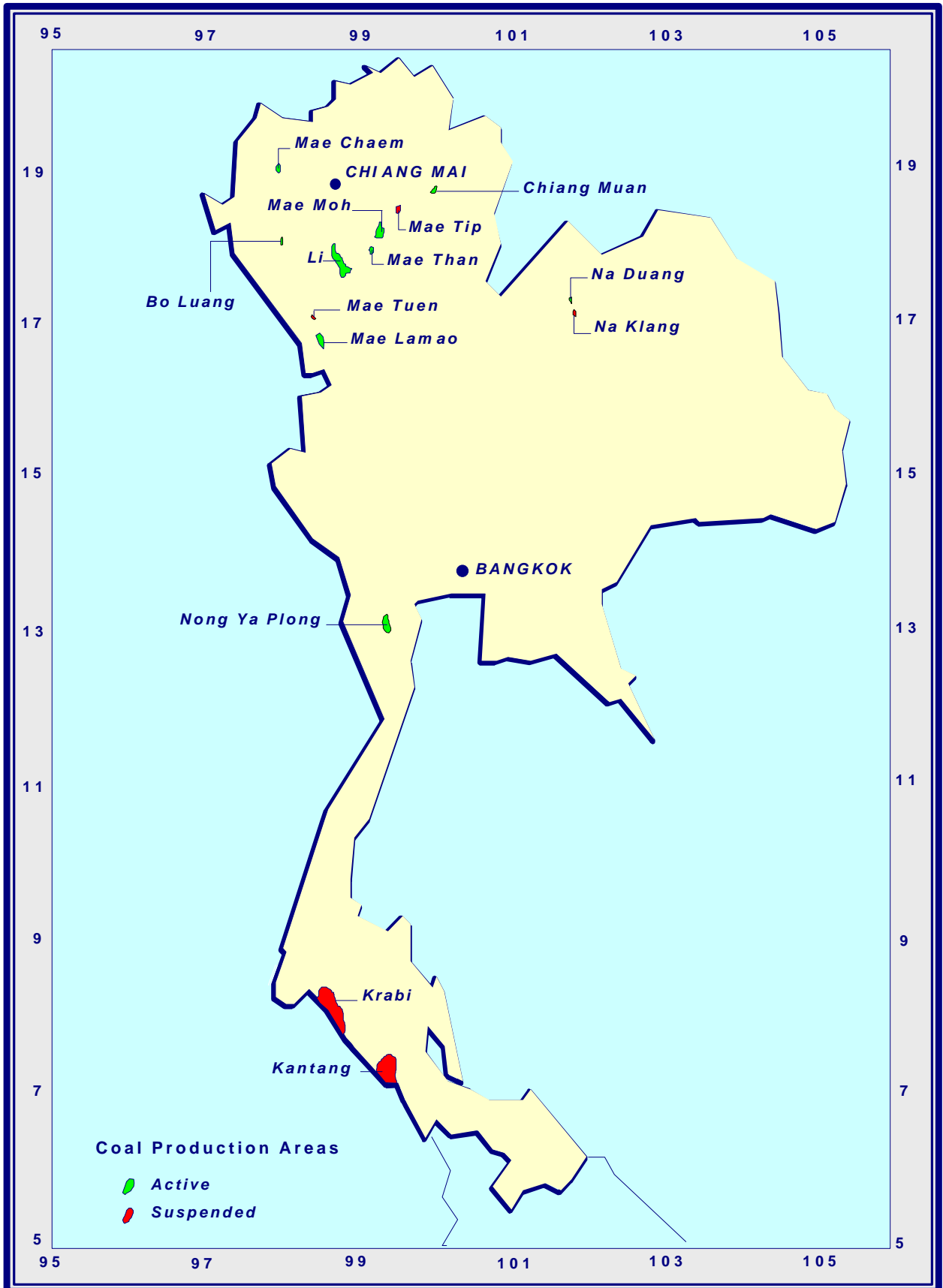
Sources : DMR, Department of Energy Development and Promotion (DEDP), EGAT, Customs Department.

Remarks : ¹ Unit in million tons. ² Data up to October 1996.

High Coal-Potential Areas Investigated by DMR in Thailand



Coal Production Areas in Thailand



Imported Coal And Coal Products During 1992-1996

Coal or It's Products	1992		1993		1994		1995		1996	
	amount ¹	CIF value ²	amount ¹	CIF value ²	amount ¹	CIF value ²	amount ¹	CIF value ²	amount ¹	CIF value ²
Anthracite	0.002	3.951	0.004	11.701	0.001	4.678	0.005	13.505	0.017	27.133
Bituminous	0.443	454.430	0.961	913.358	1.416	1,353.341	2.303	1,899.665	2.720	2,578.025
Briquettes	0.000020	0.161	0.003	1.228	0.000054	0.550	0.000054	0.447	0.000020	0.389
Coke and Semi-coke	0.073	279.470	0.084	302.369	0.110	368.549	0.100	343.669	0.086	322.165
Lignite	-	-	0.000003	0.007	0.000018	0.175	-	-	-	-
Other Coal	0.026	23.198	0.113	1.165	0.000084	0.646	0.014	7.479	0.024	9.381
Total³	0.543	761.210	1.164	1,229.828	1.527	1,727.939	2.422	2,264.766	2.848	2,937.093

Source: Customs Department

Remarks: ¹ amount in million tons.

² CIF value = million Baht

³ Data up to October 1996.

CEP Activities

The Coal Exploration and Assessment Project (CEP) carried out works which include detailed geological investigation, high-resolution seismic reflection survey, geophysical well logging and coal exploration and assessment. Selected basins with high coal-potential areas were being considered for further detailed study. The basins will be investigated and assessed in accordance with technical and economical priority.

The basins with high coal-potential areas are first assessed for power-generation purpose. The areas considered unsuitable for the power sector are then opened to public through bidding.

Summary Of CEP's Activities in 1996

Basin	Province	No. of Drillhole	Total Depth (m)	Seismic (line-km)	Geophy. Log ¹ (m)	Status	Remarks
Wiang Chai	Chiang Rai	10	1,537.00	-	-	-	-
Chiang Khong	Chiang Rai	5	952.50	-	-	-	-
Mae Tha	Lampang	21	4,596.40	50.41	-	²	-
Phrae	Phrae	3	1,782.00	30.00	-	-	continue to 1997
Total		39	8,867.90	80.41	-	-	-

Remarks: ¹ density, neutron, resistivity and sonic.

² Defined high coal-potential areas.

Planning for CEP's Activities in 1997

Basin	Province	Activities
Phayao	Phayao	Drilling, Detail Geological Investigation
Ngao	Lampang	Underground Coal Gasification
Fang	Chiang Mai	Drilling, Detail Geological Investigation
Phrae	Phrae	Drilling continue from 1995, 1996, 1997 and seismic survey
Sin Pun	Nakhon Si Thammarat	Underground Coal Gasification

Research Studies

To aim at exploiting deep seated coal bed, DMR has set up a research project to study the feasibility of underground mining for some high coal-potential areas. The study, jointly collaborated with JICA, was carried out in Nong Phlub and Mae Lamao basins. The project, started in 1995, is now in the stage of evaluation.

Conducted by EERC, University of North Dakota, coal samples of Wiang Haeng basin were studied for Coal-Water Fuel (CWF) Preparation and Gasification. Results of six bench-scale tests using the EERC-developed HWD (Hot Water Drying) technology indicated an improvement of energy density (slurry basis) of the coal from 4,450 to 6,650 Btu/lb. Pilot-scale tests were performed at 300 and 325°C and 7- and 15-minute residence times. Under 7-minute residence time, energy density increased from 4,360 to 5,830 Btu/lb at 300°C, and 6,050 Btu/lb at 325°C. The energy density was further higher to 5,980 Btu/lb at 300°C and 6,130 Btu/lb at 325°C. The energy density was further higher to 5,980 Btu/lb at 300°C and 6,130 Btu/lb at 325°C. The energy density was further higher to 5,980 Btu/lb at 300°C and 6,130 Btu/lb at 325°C. The energy density was further higher to 5,980 Btu/lb at 300°C and 6,130 Btu/lb at 325°C. The energy density was further higher to 5,980 Btu/lb at 300°C and 6,130 Btu/lb at 325°C. The energy density was further higher to 5,980 Btu/lb at 300°C and 6,130 Btu/lb at 325°C.

Coal Activities in Thailand

Gasification tests were conducted at 700 °C at 30 psig. Gas production was approximately 30% based on maf feed. A net loss of water from the process indicated the occurring of water-gas shift reaction. Hydrogen

produced was very high, accepting for 57-59% of the total gas production. No clear conclusion was made on the impact of HWD on the coal prior to gasification because of the differences in gasification conditions.

In order to provide the basis of the most efficiency and less environmental impact in development and utilization of coal deposits, DMR has prepared the Master Plan for Coal Resources Management of Thailand. Detailed Reports are available at CEP-DMR office.

List of Petroleum Concessionaires

Unocal Thailand, Ltd.

Unocal Petroleum, Ltd.

12th Floor, Central Plaza Office Building,
1693 Phaholyothin Road,
Chatuchak,
Bangkok 10900
Tel. : (662) 541-1970
Fax : (662) 541-1436

Thai Shell Exploration and Production Co., Ltd.

10 Soonthornkosa Road,
Bangkok 10110
Tel. : (662) 249-0483-4
Fax : (662) 249-0489

PTT Exploration and Production Public Co., Ltd.

PTTEP International Ltd.

PTTEP Office Building,
555 Vibhavadi Rangsit Road,
Chatuchak,
Bangkok 10900
Tel. : (662) 537-4000
Fax : (662) 537-3333, 537-4444

Premier Oil Pacific Ltd.

c/o Amarit and Associates Co., Ltd.,
984/47-48 Klongton Arcade,
Sukhumvit Soi 71,
Prakanong,
Bangkok 10110
Tel. : (662) 381-1204-8, 381-1020
Fax : (662) 381-1209

Cairn Energy Far East Ltd.

Unit 46/20, 6th floor, The Nation Tower,
46 Bangna - Trad Road, Moo 10,
Bangna, Prakanong,
Bangkok 10260
Tel. : (662) 751-4025-8
Fax : (662) 751-4029-30

Songkhla Resources Ltd.

3rd Floor, Sui Heng Lee Building,
68 Soi Santiparp, Sap Road,
Bangkok 10500
Tel. : (662) 233-8607-08
Fax : (662) 236-7985

ESSO Exploration and Production Khorat Inc.

3195/16 Rama IV Road (11th Floor),
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Fax : (662) 262-4805

Mitsui Oil Exploration Co., Ltd.

4th Floor, Boonmitr Building,
138 Silom Road,
Bangkok 10500
Tel. : (662) 236-6765-6
Fax : (662) 236-8177

Sino-U.S. Petroleum Inc.

6th Floor, Ban Chang Glass Huas Building,
1 Sukhumvit 25, Klong Toey,
Bangkok 10110
Tel. : (662) 260-6181-8
Fax : (662) 258-9926

Total Exploration and Production Thailand Total Khorat Ltd.

20th Floor, B.B. Building,
54 Asoke Road (Sukhumvit 21),
Bangkok 10110
Tel. : (662) 260-7433
Fax : (662) 260-7455-56

BG Thailand Ltd.

24th Floor, Thaniya Plaza Building,
52 Thaniya Road,
Bangrak,
Bangkok 10500
Tel. : (662) 231-2370
Fax : (662) 231-2484

Amoco Thailand Petroleum Co.

18th Floor, Sathorn City Building,
175 South Sathorn Road,
Thung Mahamek, Sathorn,
Bangkok 10120
Tel. : (662) 679-6005, 679-6015
Fax : (662) 679-6041-2

Statoil Siam Co., Ltd. Statoil (Thailand) Ltd.

Suite 2106, 21st Floor, B.B. Building,
54 Asoke Road (Sukhumvit 21),
Bangkok 10110
Tel. : (662) 260-7682-7
Fax : (662) 260-7688

Maersk Oil (Thailand) Ltd.

Suite 1905, 19th Floor, B.B. Building,
54 Asoke Road (Sukhumvit 21),
Bangkok 10110
Tel. : (662) 260-7867-9
Fax : (662) 260-7866

Thaipo Ltd.

Suite 1914, 19th Floor, B.B. Building,
54 Asoke Road (Sukhumvit 21),
Bangkok 10110
Tel. : (662) 260-7151-3, 260-7333-5
Fax : (662) 260-7150

Soco Thaitex, Inc.

23th C.P. Tower,
313 Silom Road,
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Bangkok 10500
Tel. : (662) 231-8015
Fax : (662) 231-8121

Texaco Exploration (Thailand) II Ltd.

Suite 802, Diethelm Tower A,
93/1 Wireless Road,
Bangkok 10330
Tel. : (662) 256-6245
Fax : (662) 256-6250

Amerada Hess Exploration (Thailand) Co., Ltd.

17th Floor, 990 Rama IV Building,
Rama IV Road,
Bangkok 10500
Tel. : (662) 636-1936-40
Fax : (662) 636-1941

Anschutz (Thailand) Co., Ltd.

2469/8-9 Phetchaburi Road,
Bangkapi, Huai Kwang,
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Fax : (662) 318-1995

List of Coal Operators in Thailand

Ban Pu International Limited

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Fax : (662) 207-00753

Ban Pu Public Co., Ltd.

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1550 New Phetchaburi Road,
Rajthaevee,
Bangkok 10310
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Fax : (662) 207-0696

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Lanna Lignite Co., Ltd.

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Phrae Lignite Co., Ltd.

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Siam Carbon Lignite (1978) Ltd.

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Siam Graphite Co., Ltd.

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Suche Lignite Co., Ltd.

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Abbreviation

BCF	Billion Cubic Feet
BCFD	Billion Cubic Feet per Day
BPD	Barrel Per Day
MBPD	Thousand Barrel per Day
MBPDE	Thousand Barrel per Day of Oil Equivalent
MBBL	Thousand Barrel
MMBaht	Million Baht
MMBBL	Million Barrel
MMCF	Million Cubic Feet
MMCFD	Million Cubic Feet per Day
TCF	Trillion Cubic Feet
TCFD	Trillion Cubic Feet per Day
EERC	Energy and Environmental Research Center
CWF	Coal-Water Fuel
HWD	Hot Water Drying
cP	centiPoise
maf	moisture- and air-free

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